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Climatic Studies for Ohio: An Annotated Bibliography

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Climatic Studies for Ohio: An Annotated Bibliography

MARVIN E. MILLER[1] and VALERIE J. SEIDEL[2]

INTRODUCTION

The purpose of this circular is to give a listing of Ohio climatological studies so that the existing information will be more readily available to those who require it. Letters were sent to all university and college librarians in the state, numerous individuals who have written climate-related articles, all offices of the Environmental Science Services Administration (ESSA) in Ohio, and other government offices to ask for assistance in gathering this material. However, most of the bibliography information was obtained by a thorough search of libraries at The Ohio State University, Columbus.

During the initial collecting phase of this project, all articles containing climatic data were gathered. A large number were collected but many were not related to climatology. So further screening was necessary. In reviewing the studies, the following question was considered. "Is the climatic material an important part of the study?" If the answer was yes, the article is included in this bibliography; otherwise it is not. Although considerable time was spent in thoroughly researching and listing the many entries for this bibliography, some works may have been overlooked inadvertently.

BIBLIOGRAPHY

Entries are listed alphabetically by author, except in cases where the publication is more likely to be identified with the agency under which it was published. In the latter case, the entries are arranged below the title of the agency in either numerical order by publication number or in alphabetical order by publication title. Cross-references by authors are provided to facilitate location of material. The index, arranged by subject, gives entry numbers for a specific topic and is also cross-referenced so that related material can be brought together.

1. Alexander, William H. 1923. A climatological history of Ohio. The Ohio State Univ., Eng. Exp. Sta., 745 pp.

Statistical book of climatological data recorded in Ohio up to 1923. Description of the chief climatic features of the state, progress in meteorology, important weather events, and precipitation and temperature data recorded by county.

2. ————. Oct. 1935. Floods in Ohio. The Ohio State Univ., Eng. Exp. Sta. News 7(4):21-24.

General discussion of floods in Ohio and detailed account of the flood of August 6-7, 1935, in the Muskingum Valley. The causative storm and information concerning winds, precipitation, and damage are presented in narrative form.

3. ————. 1921. Thunderstorms: especially those of Ohio. Ohio J. Sci. 22:21-38.

The first part of this article is a discussion of the properties of thunderstorms and methods of forecasting and classifying them. The second part describes the origin, number, frequency, and extent of territory of each storm entering or originating in Ohio during 1917.

4. ———— and Charles H. Patton. Dec. 1929. The climate of Ohio. Ohio Agri. Exp. Sta., Bull. 445, 69 pp.

Compilation consisting mainly of tabular information of climatological data recorded at weather observing stations and experiment stations in Ohio. Period covered is from 1912 to 1928. Data include temperature, humidity, evaporation, wind, snowfall, frost, and precipitation.

5. American Red Cross. Ohio-Mississippi Valley flood disaster of 1937: report of relief operations of the American Red Cross. Washington, D. C. 252 pp., illus.

Account of the causes and effects of the flood of 1937, the emergency relief program, and medical and nursing services of the Red Cross during restoration operations after the flood.

6. Anderson, Winston R. 1947. A comparison of environments in an ungrazed woodlot and nearby wooded pasture. M.S. Thesis, The Ohio State Univ., 119 pp.

A study of the microclimates of two types of environments in central Ohio. Data used in comparing the climatic features of each location include temperature, wind velocity, rainfall, snowfall, humidity, and evaporation.

[1]Ohio State Climatologist, Environmental Science Services Administration.
[2]Library Technician, Office of Ohio State Climatologist.

7. Ansley, Willis P. 1925. Runoff calculations to supplement observed stream flow data on the Olentangy River. B.C.E. Thesis, The Ohio State Univ., 45 pp.

Computations of surface runoff derived from rainfall data and physical characteristics of the watershed of the Olentangy River above Delaware, Ohio. A curve is presented which indicates the probable distribution of runoff throughout the year in relation to rainfall distribution.

8. Barger, Gerald L., Robert H. Shaw, and Robert F. Dale. July 1959. Chances of receiving selected amounts of precipitation in the North Central Region of the United States. First report to North Central Regional Technical Committee on Weather Information for Agriculture, Iowa State Univ., 277 pp.

The chances of receiving selected amounts of 1-, 2-, and 3-week precipitation were computed for 125 selected stations in 12 North Central states (including 11 Ohio stations) by fitting the incomplete gamma distribution to the precipitation totals found in the records. The precipitation levels for which probabilities are presented are: none or trace, at least 0.20, 0.40, 0.60, 0.80, 1.00, 1.40, 2.00, 2.80, 4.00, 6.00, and 8.00 inches.

See No. 170.

9. ————, ————, and ————. Dec. 1959. Gamma distribution parameters from 2- and 3-week precipitation totals in the North Central Region of the U. S. Second Report to North Central Regional Technical Committee on Weather Information for Agriculture, Iowa State Univ., 183 pp.

Selected statistical parameters were determined for 125 stations in 12 North Central states (including 11 Ohio stations) by fitting the incomplete gamma distribution to 2- and 3-week precipitation amounts. Parameters are presented for use in generating 4-, 5-, and 6-week precipitation distributions.

10. Bean, Louis H. Feb. 1942. Crop yield and weather. U. S. Dept. of Commerce, Misc. Pub. 471.

Annual data on crop yields and long-time records of monthly rainfall and temperature (about 1886 to 1939) are presented in order to discern weather patterns necessary for better prediction of crop yields.

11. Beeton, Alfred M. See No. 113-9-a.

12. Bere, Richard L. 1953. The effect of climatological factors on the time available to do selected farming operations in central Ohio. M.S. Thesis, The Ohio State Univ., 136 pp.

Detailed climatological data are analyzed to determine the days favorable for selected farming operations, with consideration given to various degrees of soil conditions, days of evaporation, and days available for each farming activity.

13. Blair, Thomas A. Dec. 1919. A statistical study of weather factors affecting the yield of winter wheat in Ohio. Mon. Weath. Rev. 47(12):841-847.

A method of computing the relationship between weather and yield is presented. The method involves a linear regression equation where yield is expressed as a function of selected weather elements, such as temperature, total precipitation, and percentage of sunshine. The data for this study were collected in central Ohio.

14. Boettger, Carl M. Air pollution potential east of the Rocky Mountains—fall 1959. Taft Sanitary Engineering Center, Div. of Air Pollution, Cincinnati, Ohio, 12 pp.

This bulletin summarizes the results of the 1959 program conducted at the Weather Bureau Research Station in Cincinnati. Weather of the eastern two-thirds of the U. S. was monitored and air pollution potential forecasts were disseminated to affected cities.

15. Borst, H. L., Russell Woodburn, and L. D. Baver. Jan.-Feb. 1940. The frequency and seasonal distribution of erosive rains in Ohio. Ohio Agri. Exp. Sta., Bull. 25(202):15-21.

Report of a 4-year study conducted near Zanesville of the interrelationship of rainfall amount and intensity with soil loss. About 400 rains were studied and classified according to amount of erosion they produced on a bare plot of ground. Report includes charts of monthly distribution of rains and average maximum intensities.

16. Britsch, H. L. 1926. Weather as a factor in construction work. Doc (UT/1926/B76W), Univ. of Akron.

This study presents the results of a survey of weather conditions affecting building construction in Akron, Ohio, with a detailed study of local weather conditions. The report is part of the program of the Division of Building and Housing, U. S. Dept. of Commerce, conducted to survey weather conditions in nine large U. S. cities.

17. Brown, Herbert G. August 1964. Solar radiation measurements at Neotoma. Part V. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., 54 pp.

Bio-energetics study of the effect of sunlight upon plant growth and plant processes conducted at Neotoma, with data of solar radiation measurements within three deciduous forest communities. Insola-

tion intensities at different solar elevations and hourly measurements for overcast, partly cloudy, and clear days are given.

See No. 126.

18. Browzin, Boris S. See No. 113-15-a.

19. Bruce, J. P. See No. 113-10-a.

20. Bryan, Joseph G. and Glenn R. Hilst. Jan. 1962. Preliminary meteorological analysis of National Air Sampling Network data—final report. Travels Research Center, Inc., 2 vols.

Discussion of the relationships between particulate air pollution in selected urban areas and concomitant meteorological variables. Volume I, Methods and Results, utilizes a statistical approach to the analysis of air quality data and meteorological variables. Volume II, Comparison and Interpretation of Results, attempts to test for homogeneity the pollution-meteorological conditions among these urban areas in order to determine predictability among these cities. Ohio cities included in this study are Cincinnati, Youngstown, Cleveland, and Columbus.

21. Buckley, Wallace T. March 1935. The Ohio River flood of March, 1933. Ohio J. Sci. 35: 67-77.

Account of the flood in 1933, with discussions on the cause and character of the flood, distribution of precipitation in the Ohio Valley, duration and periods of rising water, and a description of the two storms which caused the flood.

22. Bushman, Donald O. 1953. The ecological significance of Ohio's climates. Ph.D. Dissertation, The Ohio State Univ., 114 pp.

Study of the relationship between the natural vegetation of Ohio and selected climatic phenomena of significant ecological importance. The thermal and moisture regions of Ohio and the relation of climatic variations to the topography of the state are discussed.

23. Canfield, N. L. See No. 208-c.

24. Carlson, Fred A. 1939. Snowfall maps of Ohio. Ohio J. Sci. 39:43-47.

Maps of average annual snowfall and heaviest and lightest mean annual snowfall are presented, based on more than 15 years of climatological records.

25. Carter, Olen C. 1936. A study of recorded runoff from the Port Columbus Drainage System. B.C.E. Thesis, The Ohio State Univ., 85 pp.

This study is based on rainfall-runoff records collected at Port Columbus over a 5-year period. Twenty-five storms which produced the highest rates of runoff were selected for analysis of their intensity and duration, as well as airport surface conditions during the storms.

26. Chandler, David C. 1942. Limnological studies of western Lake Erie. Part II. Light penetration and its relation to turbidity. Ecology 23:41-52.

Results of year-round observations made of turbidity and light penetration in Lake Erie. The effects are studied of turbidity variations on the depth to which 1 percent of surface penetrates.

27. ——————. 1944. Limnological studies of western Lake Erie. Part IV. Relation of limnological and climatic factors to the Phytoplankton of 1941. Trans., Amer. Microscop. Soc. 63:203-236.

This article shows the relation of climatic factors to the annual abundance of certain groups of organisms (Phytoplankton). Data include annual heat budget, ice cover, solar radiation, precipitation, and wind.

28. —————— and Owen B. Weeks. 1945. Limnological studies of western Lake Erie. Part V. Relation of limnological and meteorological conditions to the production of Phytoplankton. Ecol. Monogr. 15:435-457.

This study is an evaluation of meteorological factors (solar radiation, ice cover, precipitation, and temperature) responsible for annual variations in the production of Phytoplankton in Lake Erie. Data recordings were made at Put-In-Bay, Cleveland, and Toledo.

29. Christy, Harlan R. 1951. Vertical temperature gradients in a beech forest in central Ohio. M.S. Thesis, The Ohio State Univ., 30 pp.

Report of continuous records of air temperature within various vertical gradients, or microclimatic layers, in a beech forest. These records include minimum and maximum temperatures and distribution of temperatures throughout all seasons of the year.

30. Clarke, John F. 1966. A meteorological analysis of carbon dioxide concentrations measured at a rural location. Taft Sanitary Engineering Center, Div. of Air Pollution, 11 pp. + charts.

Concentrations of carbon dioxide (CO_2) measured at a rural location near Cincinnati are presented, with a discussion of the utility of CO_2 as a tracer of urban pollution and the influence of natural emissions on concentrations of CO_2.

31. ——————. Sept. 1964. A simple diffusion model for calculating point concentration from multiple sources. APCA J. 14(9).

Four meteorological parameters were combined with source-emission data in a simple diffusion model at Cincinnati, Ohio. The model utilizes accepted diffusion coefficients and available meteorological data to estimate the emissions of atmospheric pollutants. It can be used as a forecasting tool or as a means to obtain quick estimates of point concentrations from multiple sources.

32. Clemens, Jerome M. 1965. The extent and degree of the Lake Erie effect on symmetry of annual temperature curves in Ohio. M.A. Thesis, The Ohio State Univ., 75 pp.

Through the use of regression analysis, the effect of Lake Erie on Ohio's temperatures is shown. Study of interdiurnal temperature variations and topographic features reveal the magnitude of assymmetry of annual temperature curves in relation to the distance of Lake Erie.

33. Collins, William T. and Franklin F. Snyder. 1932. Runoff as a function of previous precipitation. B.C.E. Thesis, The Ohio State Univ., 40 pp.

Method proposed in this thesis for estimating streamflow from data which depend upon previous as well as current precipitation. The investigation was conducted in the area drained by the Miami River above Dayton. Monthly and annual precipitation and runoff data from 1895-1918 are presented.

34. Cross, William P. 1948. A method of determining the probable frequency of floods on Ohio streams. M.S. Thesis, The Ohio State Univ., 65 pp.

Method proposed which combines flood records into one long record to be used in approximating median flood for any Ohio stream. Data were obtained from gaging station records for a 15-year period and from a study of 39 floods. This method is known as the station-year method.

35. ————. See No. 129.

36. Dawson, Miles. See No. 129-c.

37. Derecki, J. A. See No. 113-11-a.

38. DeSelm, Henry R. 1950. Carbon dioxide concentrations at various levels in a beech forest in central Ohio. M.S. Thesis, The Ohio State Univ., 36 pp.

Study to determine hourly and daily fluctuations in concentration gradients of carbon dioxide and to ascertain what meteorologic and biotic factors influence these gradients. The relation of carbon dioxide concentration in various microclimates to plant survival is discussed.

39. Devereaux, William C. 1917. Records at the Abbe Meteorological Observatory compared with those at the Government Building, Cincinnati. Mon. Weath. Rev. 45:224-231.

Comparison of records kept at these two locations during the year 1915-1916, including wind, precipitation, temperature, and fog data, as well as maps of the location of each station and elevations of their equipment.

40. ————. 1917. Tornadoes at Cincinnati, Ohio, March 11, 1917. Mon. Weath. Rev. 45:115-117.

Brief account of the thunderstorms and tornadoes of March 11, 1917, with details concerning the path, times, wind velocity, description, and damage by the tornadoes.

41. Dickey, Malcom G. Dec. 1909. A note on the evaporation gradient in a woodlot. Ohio Nat. 10(2):17-23.

A microclimatic experiment to determine the vertical gradient of evaporation was conducted near Columbus, Ohio. This report contains the results of the experiment, which used porous cup atmometers at various levels from the ground to measure the evaporation gradients.

42. Doan, Kenneth H. 1942. Some meteorological and limnological conditions as factors in the abundance of certain fishes in Lake Erie. Ecol. Monogr. 12:293-314.

This paper attempts to establish correlations between temperature, turbidity, and precipitation in order to define conditions which result in large or small populations of Lake Erie fishes. Meteorological data were recorded at five Ohio stations.

43. Dreibelbis, F. R. 1950. A summary of data on soil and air temperatures at the North Appalachian Experimental Watershed, Coshocton, Ohio. Soil Sci. Soc. Am. Proc. 15:394-399.

This article presents maximum and minimum soil and air temperatures recorded in an 8-year study to show the influence of temperature on plant development, surface tension, and microbiological activity.

44. ————. August 1962. Some aspects of watershed hydrology as determined from soil moisture data. J. Geophys. Res. 67:3425-3435.

Data are presented on soil moisture regimen in lysimeters and their adjacent watersheds. Discussion of the effects of soil moisture conditions on runoff and evapotranspiration. The study, conducted at Coshocton, Ohio, utilized the neutron method of determining soil moisture content.

45. ————. April 1949. Some influences of frost penetration on the hydrology of small watersheds. Trans., Am. Geophys. Un. 30:279-282.

Study done at Coshocton, Ohio, which utilized precipitation and temperature data, as well as types of frost which affect soil permeability, in determining the influence of frost penetration on hydrologic and agronomic problems.

46. ———————. July 1952. Some relationships of precipitation and soil loss on small agricultural watersheds. J. Soil and Water Cons. 7:113-116, 127.

Discussion of the correlations between annual and monthly precipitation with soil erosion and rain falling at high intensities with soil erosion. Rainfall data are arranged in storm totals and intensity categories. The study was done at Coshocton, Ohio.

47. ——————— and F. A. Post. 1944. Some seasonal changes in the pore space and moisture relationships of woodland, pasture, and cultivated soils. Soil Sci. Soc. Am. Proc. 8:102-108.

Information on potential infiltration and transmission capacity of soil of four different types. Hydrographs of storm runoff were presented for a storm in April 1940 to reveal conditions of infiltration and runoff for all watershed studies in the Coshocton area.

48. ——————— and ———————. 1940. Studies on soil moisture relationships at the North Appalachian Experimental Watershed. Soil Sci. Soc. Am. Proc. 5:377-385.

Report of studies of soil moisture conditions on natural watersheds with different soil types and different land use practices. The relations of such factors as moisture equivalent, total pore space, and amount of precipitation to soil moisture conditions are discussed.

49. Ecology. 1948. Temporary changes of certain limnological conditions in western Lake Erie by a windstorm. Ecol. 29(4):501-505.

Description of the changes in certain limnological conditions following a northeast windstorm. Data are presented on wind velocity and direction, horizontal variations in turbidity, and temperature changes.

50. Feyerham, A. M., L. D. Bark, and W. C. Burrows. 1966. Probabilities of sequences of wet and dry days in Ohio. Kansas State Univ., Agri. Exp. Sta., North Central Reg. Res. Pub. 161, Kansas Tech. Bull. 1391, 59 pp.

Tables of rainfall probabilities for 24-hour periods are presented. The method of forecasting is based on historical climatological data rather than current atmospheric conditions. It is based on the assumption that precipitation patterns in the next 30 to 50 years will be similar to those during the past 30 to 50 years.

51. Finney, H. R., N. Holowaychuk, and M. R. Heddleson. 1962. The influence of microclimate on the morphology of certain soils on the Allegheny Plateau of Ohio. Ohio Agri. Exp. Sta., Project 106.

Transect studies of soil sequences were made across four valleys in southeast Ohio. Differences in the morphology of the soils are closely related to the microclimatic regimes of each area. A description of the different microclimates is provided.

52. Fitzgerald, Edward and Franklin D. Stewart. 1913. Calculation of runoff of the Indianola Sewer District. M.S. Thesis, The Ohio State Univ., 13 pp.

The purpose of this study, conducted in Columbus, Ohio, was to obtain a constant of runoff for the Indianola Sewer District and duration of storms producing maximum conditions of runoff. Data include rainfall records of the great flood of 1913.

53. Fletcher, Lyle R. 1932. The Amish people of Holmes County, Ohio: a study in human geography. M.A. Thesis, The Ohio State Univ., 98 pp.

Account of the early history of the Amish people and the geographic problems they encountered in their search for a location suitable for agriculture and isolation. A correlation is made of the climatic influences upon the cultural pattern of the people.

54. Foris, Julius and David L. Foreman. 1961. A qualitative survey of atmospheric pollution potentials in Tiffin, Ohio. Ohio Dept. of Health, Div. of Industrial Hygiene, 42 pp.

A collection of information concerning pollutant sources, topography, population, and meteorology in an attempt to assay potential or existing effects of overall pollution on Tiffin's atmosphere. The study includes traffic surveys and industrial and climatological data in order to reveal major air contaminants and the degree of severity of the air pollution problem in this city.

55. Freeman, John R. 1926. Regulation of the Great Lakes. Providence, Akerman, 548 pp.

Changes in climatic conditions, chiefly in rainfall and evaporation, caused low levels in the Great Lakes. This volume contains a detailed study on evaporation of the Great Lakes, as well as rainfall data recorded at selected points for each lake. Lake level estimations were made using such meteorological data as temperatures of dewpoints, air temperatures, wind velocity, and evaporation loss for each lake.

56. Fritts, Harold C. Jan. 1956. Radial growth of beech and soil moisture in a central Ohio forest during the growing season of 1952. Ohio J. Sci. 56(1):17-28.

Blacklick Woods, located east of Columbus, was the site of a microclimatic study to determine the relation of the radial growth of beech trees to soil moisture regimes. Radial increases of tree trunks were measured by dendrometers and this data were

correlated with data of daily precipitation and temperature measurements. Differences in the growth curves for the trees located in different habitats revealed the effects of microenvironmental factors on plant growth.

57. Frost, S. L. See No. 129-1.

58. Garriot, E. B. See No. 205-b.

59. Gilbert, Gareth E. 1953. Rainfall interception by a relatively undisturbed deciduous forest in central Ohio. Ph.D. Dissertation, The Ohio State Univ., 63 pp.

A study of rainfall interception conducted at Blacklick Woods over a period of 1 year. Measurements of rainfall and intensity, throughfall, and stemflow are presented in relation to the percentage of interception, taking into account such factors as wind, evaporation, and amount of aerial surfaces.

60. ―――――― and Herbert G. Brown. April 1962. A preliminary report concerning solar radiation distribution within deciduous forest vegetation of Neotoma during cloudless days. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Spec. Report No. 6, 25 pp.

Quantitative data throughout all seasons of the year of the receipt and interception of solar radiation by three deciduous forest communities of Neotoma on cloudless days are presented. The distribution of the daily flux of solar radiation at the above-canopy and near the forest-floor levels is given.

See No.126.

61. Goldthwaite, Richard P. July 1959. Scenes in Ohio during the last Ice Age. Ohio J. Sci. 59(4): 193-215.

Study of surficial deposits of western Ohio in an attempt to re-interpret Ice Age history and determine weather conditions which prevailed at the time of the Wisconsin Glacier. A comparison is drawn between Ice Age climate and the climate of the ice caps found today in higher latitudes. A discussion is presented of weather data recorded recently where the glacier in Ohio was located.

62. Grover, Nathan C. See Nos. 201-b and 201-c.

63. Harris, D. Lee. See No. 113-9-c.

64. Harrold, L. L. Nov. 1955. A study of rainstorms. Soil Cons. 21(4):90-94.

This article defines the relationship of precipitation to conservation practices and the magnitude of rainstorm effects in watershed programs. The author discusses the characteristics of dormant and growing season storm precipitation and presents facts about precipitation from various studies at Coshocton, Ohio.

65. ――――――. June 1947. Comparison of lysimeter runoff, infiltration, and percolation to stream flow. Trans., Am. Geophys. Un. 28:438-442.

This report gives details on rainwater disposal factors by utilization of soil moisture content measurements during a wet period in March 1945. The data, including rainfall and runoff graphs, were obtained from lysimeters at Coshocton, Ohio.

66. ――――――. Oct. 1962. Estimating flood volumes and hydrographs corresponding to peak flows of given frequencies for small agricultural watersheds. J. Geophys. Res. 67(11):4341-4346.

Method is presented for computing flood-flow volumes and hydrographs corresponding to flood-peak frequency values for watersheds. The method involves determining annual maximum flood-peak values by extreme value probability analysis for a number of recurrence intervals. Data were obtained from watersheds at Coshocton, Ohio.

67. ――――――. Oct. 1955. Evapotranspiration rates for various crops. Agri. Eng. 36:669-672.

Collection of evapotranspiration data for different crops and seasons obtained from lysimeters at Coshocton, Ohio. The effects of humidity on evapotranspiration are discussed and double-mass curves are plotted for selected crops in order to show the relationship of evaporation and evapotranspiration.

68. ――――――. Oct. 1949. Has the small-area flood been neglected? Civ. Eng. 19:38-39.

Small-area floods have distinctive characteristics which differentiate them, such as different seasonal occurrences, character of causative rainfalls, and types of damage incurred. This report analyzes these characteristics collected at monthly intervals at various Ohio River drainage basins in summer and winter during the period 1940-1947.

69. ――――――. Feb. 1958. Lysimeter checks on empirical evapotranspiration values. Agri. Eng. 39:94-97.

Report on the standard of accuracy and adjustments for improvement of the weighing monolith lysimeters at Coshocton, Ohio, and a comparison of recently developed methods for estimating evapotranspiration values with results of the lysimeters.

70. ――――――. April 1957. Minimum water yield from small agricultural watersheds. Trans., Am. Geophys. Un. 38:201-208.

Method discussed for analyzing and reporting data on minimum runoff from watersheds. Eighteen years of precipitation and runoff records (1938-1955) from Coshocton, Ohio, were used. A relationship was established to provide means of estimating yearly minimum runoff values.

71. __________ and F. R. Dreibelbis. Dec. 1951. Agricultural hydrology as evaluated by monolith lysimeters. U. S. Dept. of Agr., Tech Bull. 1050, 149 pp.

Summary of the results of a 10-year study at Coshocton, Ohio, where measurements of various water cycle factors under different seasonal, vegetal, and soil type conditions were obtained. Data include records of precipitation, wind movement, humidity, temperature, evaporation, condensation, and evapotranspiration.

72. __________ and __________. Jan. 1967. Evaluation of agricultural hydrology by monolith lysimeters, 1956-1962. U. S. Dept. of Agr., Tech. Bull. 1367, 123 pp.

Progress report on lysimeter investigations carried on at the North Appalachian Experimental Watershed at Coshocton, Ohio. Data are provided on moisture extraction rates by evapotranspiration. Amount of soil pore space available for storm rainfall absorption and flood forecasting depend on this data. Other data included in this work are monthly and annual precipitation, transpiration, evaporation, and temperature recordings. This report supersedes Tech. Bull. No. 1179, which presented data for the period 1944-1955.

73. __________ and __________. August 1963. Evidence of errors in evaluation of dew amounts by the Coshocton lysimeters. IASH, Pub. No. 65, pp. 425-431.

Report on the results of the search made on Coshocton lysimeter records for the cause of abnormal diurnal cyclic weight fluctuations in the evaluation of dew amounts.

74. __________ and __________. Jan. 1953. Water use by crops as determined by weighing monolith lysimeters. Soil Sci. Soc. Am. Proc. 17(1):70-74.

Information presented on water use by crops as determined from evapotranspiration and precipitation data obtained from weighing monolith lysimeters. Data collected over 10-year period 1941-1951 at Coshocton, Ohio.

75. __________ et al. Jan. 1962. Influence of land use and treatment on the hydrology of small watersheds at Coshocton, Ohio, 1938-1957. U. S. Dept. of Agr., Tech. Bull. No. 1256, 194 pp.

This bulletin covers many hydrologic aspects of land management on small watersheds. Climatological data from the Soil and Water Conservation Research Station are presented and include precipitation, temperature, snow, frost, humidity, wind movement, evaporation, and storm records.

76. __________ et al. March-April 1959. Transpiration evaluation of corn grown on a plastic-covered lysimeter. Soil Sci. Soc. Am. Proc. 23(2): 174-178.

Results of an experiment performed at Coshocton, Ohio, where corn was grown on a plastic-covered lysimeter to determine the magnitude of transpiration of corn and soil evaporation in the evapotranspiration process.

77. Henry, Alfred J. See No. 205-c.

78. Hershfield, David M. See No. 210-40.

79. Hopkins, Ernest J. 1929. The effect of weather on the yield of oats in Ohio. M.S. Thesis, The Ohio State Univ., 39 pp.

Description of a curvilinear correlation method used to indicate the relation of weather conditions to crop yields of oats during the summer months. The author discusses the effects of heat and moisture on crop growth.

80. Horn, David L. 1961. Development and evaluation of rational runoff coefficients for small agricultural watersheds. M.S. Thesis, The Ohio State Univ., 152 pp.

This study utilized empirical data in developing runoff coefficients for use in rational runoff formulae. The method was evaluated by means of a comparison with peak runoff rates obtained from frequency curves of the gaged watershed at Coshocton, Ohio.

81. Horton, A. H. See No. 201-a.

82. Houk, I. E. 1921. Rainfall and runoff in the Miami Valley. Miami Valley Cons. Dist., Dayton, Ohio, Tech. Report No. 8, 234 pp.

Summary of the results of rainfall and runoff investigations of the flood control project of the Miami Valley. Rainfall, soil moisture, and temperature data recorded at drainage areas of the Miami River.

83. Hoyt, W. G. See No. 201-c.

84. Hutter, Henry K. 1952. Eighty years of weather and climate at Toledo, Ohio. Ohio J. Sci. 52(2):62-75.

Summary of weather in Toledo from 1871 to 1950, including such data as killing frosts, mean and extreme temperatures, monthly precipitation, 10-year precipitation trends, lake influences, snowfall, thunderstorms, wind, humidity, fog, and other meteorological phenomena.

85. Hyde, G. A. April 1, 1896. The weather at Cleveland, Ohio: what it has been for 40 years. Hiles and Coggshall, Printers, 23 pp.

This is a personal account by a volunteer observer of the U. S. Weather Bureau of meteorological

events, such as weekly, monthly, and yearly averages of rainfall and snowfall, cloudiness of the sky, and winds during the period 1855-1896.

86. Irish, Shirley M. and George W. Platzman. Feb. 1962. An investigation of the meteorological conditions associated with extreme wind tides on Lake Erie. Mon. Weath. Rev. 90:39-47.

Dates of incidence of extreme wind tide on Lake Erie were determined for the 20-year period of 1940-1959. A frequency-intensity analysis reveals the probabilities of the occurrence of wind tides throughout the year.

87. Jennings, Arthur H. See Nos. 210-2 and 210-16.

88. Kaser, Paul. See No. 129-i.

89. King, K. M., C. B. Tanner, and V. E. Suomi. Dec. 1956. A floating lysimeter and its evaporation recorder. Trans., Am. Geophys. Un. 37: 738-742.

Description of a weighing monolith lysimeter used to obtain continuous values of evapotranspiration from an irrigated pasture. The lysimeter is located at Coshocton, Ohio.

90. Koch, Jerry A. April 1961. A preliminary investigation of internal water relations of tree stems by electric resistance. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Spec. Report No. 5, 12 pp.

Report of an experiment done at Neotoma where relative changes in water content are graphically correlated with radial change data and environmental data, such as temperature, precipitation, solar radiation, and atmospheric water vapor.

See No. 126.

91. __________. 1962. Neotoma solar radiation: summer, 1958, through spring, 1961. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Spec. Report No. 11.

Report of solar radiation measurements occurring at the above-canopy and forest-floor levels at several deciduous communities in Neotoma.

92. __________ and Gareth E. Gilbert. Dec. 1962. Report of preliminary analyses concerning Neotoma solar radiation data. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Supp. No. 7, 9 pp.

Account of a project conducted at Neotoma relating to the receipt and interception of solar radiation by the vegetation of four major habitats in the area. The methods utilized in field instrumentation and data transcription are discussed, as well as the effects of snow, frost, and dew interference.

93. Kohler, M. A. See No. 210-37.

94. Kohnke, H., F. R. Dreibelbis, and J. M. Davidson. 1940. A survey and discussion of lysimeters and a bibliography on their construction and performance. U. S. Dept. of Agr., Misc. Pub. 372, 67 pp.

A description is provided of large soil-block lysimeters installed at Coshocton, Ohio, as well as a bibliographical section containing about 500 references on lysimeters. Tables are included with evaporation, transpiration, and precipitation data. The history of lysimeters is presented in tabular form.

95. Kopec, Richard J. Feb. 1965. Continentality around the Great Lakes. Bull., Am. Meteorol. Soc. 26(2).

Detailed maps are presented illustrating the converse nature of the Great Lakes in offsetting continentality values for the interior of North America. The maps are constructed by the use of Conrad's Coefficient of Continentality Index and an analysis is made of the isoplethic pattern of continentality.

96. Korshover, Julius. 1967. Climatology of stagnating anticyclones east of the Rocky Mountains, 1936-1965. Public Health Serv., Pub. No. 999-AP-34, National Center for Air Pollution Control, Cincinnati, Ohio, 15 pp.

A 30-year climatology is presented to delineate occurrences of stagnating anticyclones in the eastern United States, including Ohio. Occurrences of stagnation are determined on the basis of pressure-gradient values considered with other meteorological factors. Affected areas are depicted on maps by use of a grid-point system.

97. Kuessner, Robert. Sept. 1965. A technique for deriving an objective precipitation forecast scheme for Columbus, Ohio. U. S. Weath. Bur., Tech. Memo. No. 3, 6 pp.

A local objective forecast study for Columbus, Ohio, which investigated the possibility whether the relationship between predictors and predictands found in Parkersburg, W. Va., would apply to the Columbus area. A high degree of reliability would enable formulating a standardized procedure for forecasting precipitation which would account for local effects due to geographic and atmospheric differences. Data used in the study were taken from 24-hour prognostic charts, as well as from observations on type and duration of precipitation, magnitude of vorticity, baroclinic vertical motions, and the effect of the Great Lakes.

98. Landsberg, H. E. 1960. Some patterns of rainfall in the North-Central U.S.A. (U. S. Weath. Bur., Office of Climatology). Archiv fur Meteorologie, Geophysik and Bioklimatologie, Serie B, Allgemeine und biologische Klimatologie, Band 10, 2 heft.

A study attempting to discover any geographical or sequential patterns of precipitation in the North Central States, using the wettest and driest weeks to compute probabilities. The project is based on the studies of precipitation probabilities by Barger, Shaw, and Dale of the North Central Region of State Agricultural Experiment Stations.

99. Laughlin, Ronald R. August 1964. Soil moisture conditions at Neotoma with special reference to a period of drought. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Report No. 7, 67 pp.

An investigation to determine soil moisture conditions at four major study areas within Neotoma. The objective was to relate the yearly march of soil moisture conditions to other environmental factors. The survey was conducted in 1963 during a 40-day period without rain. Precipitation records were utilized for a 10-year period, with amount, distribution, and intensity of precipitation recorded hourly.

See No. 126.

100. ________ and Gareth E. Gilbert. Dec. 1962. Neotoma weekly soil moisture data, 1955-1961. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Supp. No. 3, 32 pp.

Weekly soil moisture values are presented from soil samples from four deciduous communities at Neotoma from 1955-1961. A comparison of soil moisture regimes of various habitats is made, the amount of soil moisture throughout the year is determined, and correlations between soil moisture and other environmental factors are drawn.

101. ________ and ________. Water table fluctuations of the Neotoma Valley bottom from winter season, 1960-1961, through summer season, 1962. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Spec. Report No. 15, 10 pp.

A continuously recording water level recorder was placed in an open valley at Neotoma to obtain a more precise record of water table depths and fluctuations, as well as the water budget for the entire watershed of the study area. Data are analyzed with respect to time, duration, and intensity of precipitation, season of the year, and temperature.

102. Leighly, John. 1942. Effects of the Great Lakes on the annual march of air temperature in their vicinity. Pap., Mich. Acad. Sci., Arts, Letters. 27: 377-414.

Interpretation of the influence of the Great Lakes on the march of temperature in the air above surrounding lands by use of charts showing curves of effective insulation. Data on charts include mean daily temperature and the annual range of mean daily temperatures.

103. Marshall, Logan. *c*1913. True story of our national calamity of floods, fire, and tornado. George F. Lasher and the John Winston Co., Philadelphia, 352 pp.

The floods of 1913 in Dayton, Columbus, Cleveland, and other parts of Ohio are included in this work, which is a narrative account with very few statistics. It deals mainly with the damages caused by the floods and the relief programs.

104. Martin, Howard H. August 1918. Hourly frequency of precipitation in central Ohio and its relation to agricultural pursuits. Mon. Weath. Rev. 46(8):375-376.

Discussion of the frequency of precipitation, its distribution throughout daytime and nighttime, and its effect upon crop growth. Hourly frequency of precipitation was recorded at Columbus by months and seasons during the year 1906-1907.

105. ________. Oct. 1919. The relation of wind direction to subsequent precipitation in central Ohio. Mon. Weath. Rev. 47(10):730-733.

Relationships between observed wind direction and subsequent precipitation are revealed by means of tables and graphs. The probability of frequency of precipitation is determined and this frequency factor is used to establish the true prognostic value of wind direction.

106. McGuinness, J. L. Oct. 1966. A comparison of lysimeter catch and rain gage catch. U. S. Dept. of Agr., Agri. Res. Serv., ARS 41-124, 9 pp.

A comparison is made between precipitation catch of three weighing lysimeters and their adjacent recording rain gages. Factors considered in making the comparison include the effects of windspeed, degree of slope, evapotranspiration, blowing snow, and the cooling effects of rain on the grease seals of the lysimeter catches.

107. ________. August 15, 1963. Accuracy of estimating watershed mean rainfall. J. Geophs. Res. 68(16):4763-4767.

Computations were made of the average error in determining mean rainfall on watersheds in relation to rainfall amount and gaging ratios. The results are combined with previous analyses and a nomogram is presented to facilitate estimates of error for gaging ratios of 0.1 to 1000 square miles per gage. The study was conducted at Coshocton, Ohio, and the data were obtained during the period 1937-1942.

108. ________ and L. L. Harrold. June 1965. Hydrologic characteristics of the June 1963 storm and flood, Coshocton County, Ohio. North Appalachian Experimental Watershed, Res. Report No. 377, 23 pp.

Local severe storm of June 5, 1963, in Coshocton County served as a feasible study of techniques of surveying a storm area and obtaining rainfall measurements from small gages. The areal distribution of rainfall amounts was defined due to prompt field surveys of gages. An isohyetal map of the storm is presented and the rainfall frequency is calculated.

109. ________ and________. Oct. 1962. Seasonal and areal effects on small-watershed streamflow. J. Geophys. Res. 67(11):4327-4334.

Small-area streamflow regimes at Coshocton are found to be regulated primarily by the seasonal effect of evapotranspiration. This study is an investigation of seasonal and areal effects upon streamflow, taking into account various climatic factors such as precipitation gradients, annual precipitation, temperature, evaporation, and any unusual climatic influence to indicate the normalcy of the period. Data were collected in the period 1940-1960.

110. ________, ________, and F. R. Dreibelbis. June 3, 1958. The effects of land-use practices on runoff, erosion, and crop yields as evaluated by small single-crop watersheds. U. S. Dept. of Agr., Soil and Water Cons. Res. Div., Res. Report No. 310, 24 pp.

Results of an experimental program at Coshocton, Ohio, to compare the effects of land-use practices upon characteristics of runoff and amounts of soil loss by erosion. Data include peak runoff, total runoff amounts, seasonal distribution of precipitation, effects of extreme rainfall intensities, and storm runoff totals.

111. ________, ________, and ________. March 1960, Some effects of land use and treatment on small single-crop watersheds. J. Soil and Water Cons. 15(2):65-69.

Studies on eight small watersheds at Coshocton showed that improved farming practices resulted in smaller rates of runoff and more water absorption. Data are presented for the period 1945-1956, as well as the amounts of runoff and soil loss during a major storm in 1957.

112. McVehil, G. E. See No. 113-13-a.

113. Michigan, University of. Great Lakes Research Division. Publications.

The Great Lakes Research Division was established in 1945 for the integration of studies of several aspects of the Great Lakes and related areas. The publications cover a wide range of subjects, such as rainfall, water vapor, precipitation, and storms over the lakes and the effects of these weather phenomena on surrounding land.

Phase I. July 1958. Exploration of collateral data potentially applicable to Great Lakes hydrography and fisheries: Final report. 159 pp.

Tables of onshore and inland data sources of the location and extent of records for the Great Lakes area are presented, including 74 stations in Ohio. The data are separated into hydrographic and meteorologic types. The length of record and the parameters measured are indicated for each station.

Pub. No. 5. Powers, Charles F. and David L. Jones. 1960. Applications of data collected along the shore to conditions in Lake Erie. 78 pp.

A technique is described for determining wind patterns over Lake Erie whereby a kinematic analysis of the atmosphere makes an accurate computation of wind-produced currents and current patterns at any time in the past 60 years. Charts are presented containing rainfall data recorded since 1810 and lake level recordings prior to 1860.

Pub. No. 9. 1962.

a. pp. 68-76. Beeton, Alfred M. Light penetration in the Great Lakes.

Measurements were made of incident and subsurface light intensities at several depths in the Great Lakes and one study was made of the spectral distribution of ambient irradiance in each of the lakes. Also discussed in this publication is the study of changes in light intensities at several depths in Lake Erie from sunrise to sunset.

b. pp. 103-110. Richards, T. L. and J. P. Fortin. An evaluation of the land-lake vapor pressure relationship for the Great Lakes.

An evaluation is presented of the humidity ratio in finding land-lake vapor pressure relationships used in quantitatively determining evaporation from a large body of water. The study, conducted on Lake Erie, utilized evaporation figures calculated by correlating lake influences with parameters over water and land.

c. pp. 123-126. Harris, D. Lee and Aldo Angelo. A regression model for the prediction of storm surges on Lake Erie.

An empirical comparision between observed and computed values for the storm surge is made, with data of hourly wind and pressure from Toledo, Sandusky, and Cleveland. The method utilized involves numerical integration of hydrodynamic equations in linearized form.

Pub. No. 10. 1963.

a. pp. 140-148. Bruce, J. P. Meteorologic factors affecting the freshwater environment.

Review of recent studies concerning exchange of matter, heat, and momentum between lakes and atmosphere. The studies deal with such topics as Great Lakes precipitation and evaporation, ice formation, wind speeds, and the exchange of radioactive materials between lake and atmosphere.

b. pp. 204-215. Richards, T. L. Meteorological factors affecting ice cover on the Great Lakes.

An aerial ice reconnaissance study of Lake Erie and Lake Superior over the period 1959-1963 revealed a correlation between ice cover and the accumulation of freezing and thawing degree days recorded at nearby meteorological stations. A statistical method based on antecedent heating and accumulation of freezing degree days is devised for forecasting ice cover.

Pub. No. 11. 1964.

a. pp. 217-227. Derecki, J. A. Variation of Lake Erie evaporation and its causes.

Monthly evaporation from Lake Erie is determined by a water budget method for the 1937-1959 period. Variation of evaporation is analyzed statistically. Indexes of air-water temperature differences, heat influx by radiation, humidity, precipitation, and wind speed are utilized.

b. pp. 253-266. Munn, R. E. and T. L. Richards. The lake breeze: a survey of the literature and some applications to the Great Lakes.

Land and lake breeze circulations of the Great Lakes are discussed, using climatological records and specific examples. Distinction is made between a lake-breeze frontal surface and an internal boundary layer. The micrometeorology of small islands and lakes is presented.

c. pp. 294-310. Thomas, Morley K. A survey of Great Lakes snowfall.

Report on lake effect snowfall and synoptic analyses of snowstorms of the Great Lakes. The extremes and trends of lake snowfall and a review of the methods of recording snowfall depths are presented.

Pub. No. 13. 1965.

a. pp. 262-272. McVehil, G. E. and R. L. Peace. Some studies of lake effect snowfall from Lake Erie.

An analysis of recent cases of lake-induced snowfall along the southern and eastern shores of Lake Erie. Large-scale weather situations in which severe lake effect snowstorms occur and some of the mesoscale features of snow squall bands are presented. Radar photographs are analyzed to show the frequency of banded convective precipitation and characteristics of the precipitation pattern. The rates of heat transfer and evaporation from Lake Erie to cold polar air masses have been estimated from synoptic radiosonde data.

b. pp. 273-277. Platzman, George W. The daily variation of wind set-up on Lake Erie.

Daily variation of lake level is computed from 6 months of hourly data at several gage locations on Lake Erie, as well as analysis of daily variation of surface wind vector. The diurnal constituent of the lake level is revealed and evidence is presented which supports the hypothesis that the diurnal constituent of lake level is caused by the diurnal constituent of wind stress.

c. pp. 278-282. Richards, T. L. and P. Loewen. A preliminary investigation of solar radiation over the Great Lakes as compared to adjacent land areas.

Comparisons of daily measurements of solar radiation taken by the Great Lakes research vessel, C.C.G.S. Porte Dauphine, with simultaneous observations from adjacent shoreline stations, including Cleveland, Ohio, are presented.

Pub. No. 15. Browzin, Boris S. 1966. Annual runoff in the Great Lakes—St. Lawrence Basin. pp. 203-215.

Annual runoff is expressed in terms of unit runoff with consideration of such factors as the seasonal distribution of precipitation and mean annual temperature.

Special Report No. 8. Powers, Charles F. and David L. Jones. 1959. Sources of hydrographic and meteorological data on the Great Lakes. 183 pp.

This volume gives the location of all pertinent sources of meteorological data within the Great Lakes Basin, as well as inland data for selected Ohio stations. A discussion of the influence of the lakes on weather is presented.

114. Miller, Marvin E. Jan. 1967. Forecasting afternoon mixing depths and transport wind speeds. Mon. Weath. Rev. 95:35-44.

Mixing depth and transport wind speed are considered the most important meteorological variables which determine the dilution of air pollutants over urban areas. Parabolic regression equations of relationships between these quantities and selected independent variables are derived from 67 rawinsonde stations.

115. ________. Ohio tornado statistics. U. S. Weath. Bur., Office of the State Climatologist. Unpublished.

This is a brief summary of tornadoes which have occurred in Ohio since 1900, including descriptions of tornadoes, frequency of occurrence, destructive effects, and a resume of Ohio's most destructive tornadoes. This publication, written by the State Climatologist of Ohio, is available at the Columbus Weather Bureau Office.

116. ________ and C. R. Weaver. 1968. Monthly and annual precipitation probabilities for climatic divisions in Ohio. Ohio Agri. Res. and Dev. Center, Res. Bull. 1005.

Mean distribution of monthly and annual precipitation probabilities have been prepared for ten climatic divisions in Ohio. Probabilities are derived from the cumulative distribution of incomplete gamma function.

117. Mills, Robert H. 1943. An ecological study of a central Ohio woodlot. M.S. Thesis, The Ohio State Univ.

Comprehensive report of the ecological factors in a Franklin County woodlot, including climatic data such as the mean and extreme temperatures, precipitation, snowfall, and wind velocity.

118. Mindling, George W. 1946. Climatic features in Ohio. Unpublished. 269 pp.

A summary of climatic data for the period 1918-1946 as recorded by each station in Ohio. Data include temperature (monthly, daily maximum and minimum, degree days, variations across the state, etc.), frost, humidity, precipitation, wind, snowfall, severe storms, and sunshine.

119. ________. 1944. Weather headlines in Ohio. The Ohio State Univ., Eng. Exp. Sta., Bull. 120, 124 pp.

Significant weather events since 1844 in Ohio are presented in narrative form. Dry periods, heavy rains, floods, frosts, storms, tornadoes, annual precipitation, temperature, and the severity and extent of damages are discussed.

120. Mitchell, J. Murray. See No. 209-43.

121. Morgan, Arthur E. 1951. The Miami conservancy district. McGraw-Hill Book Co., New York, 504 pp.

Account of the purposes, work, and control programs of the Miami Conservancy District and the role it played in providing relief and aid during the Miami River flood of March 1913.

122. Mosely, Edwin L. July 1939. Long time forecasts of Ohio River floods. Ohio J. Sci. 39(4): 220-231.

Precipitation cycles are discerned from Ohio River flood records beginning in 1762. A trend is revealed where excessive precipitation will fall during the summer approximately every 90.4 years. Predictions are made according to this flood cycle data as to what the weather will be in selected years after 1939.

123. ________. 1943. Precipitation prospects, 1943-1947, for Ohio and near-by states. Pap., Mich. Acad. Sci., Arts, Letters 29:23-29.

Method of forecasting excessive and deficient rainfall by use of a 90.4-year cycle based on the magnetic sun-spot cycle is presented. A correlation is drawn between tree ring width and the amount of rain falling during the growing season. Precipitation forecasts are made for the years 1943 to 1947.

124. Munn, R. E. See No. 113-11-b.

125. National Center for Air Pollution Control, Cincinnati, Ohio. See No. 203.

126. Neotoma Ecological and Bioclimatic Research Program. Publications.

Neotoma is a small wooded valley, located in south-central Ohio, owned by Dr. Edward S. Thomas. For more than 40 years it has been the site of various ecological and bioclimatic investigations concerned with the study of microenvironments and the recording of meteorological data, such as temperature, precipitation, wind velocity, and solar radiation. The laboratory, used by the students and faculty of The Ohio State University, is under the direction of Dr. Gareth E. Gilbert.

See Index for references to Neotoma publications.

127. Niemeyer, Lawrence E. 1962. Summer sun—Cincinnati smog: a recent incident. Public Health Service, Taft Sanitary Engineering Center, Cincinnati, Ohio, 7 pp.

In May 1962, weather combined with normal activities within the Cincinnati metropolitan area to bring about an air pollution incident. This report discusses the meteorological conditions and air quality data during this incident.

128. Notestine, James C. 1964. Mathematical model of air temperatures for computer analysis. M.S. Thesis, The Ohio State Univ., 83 pp.

This study analyzes temperature characteristics for 1948 to 1963 at Columbus, Ohio, and describes mathematically the daily mean temperature and hour of maximum temperature occurrence as related to the day of year. Eight polynomial approximations relating temperature parameters for wet and dry bulb temperatures form a mathematical model which expresses temperature characteristics of a particular location.

129. Ohio, Division of Water. Publications.

a. Sanderson, Earle. May 1950. The climatic factors of Ohio's water resources. Bull. No. 15, 130 pp.

A complete summary of climatic data for the period 1921-1945, which has been used in Ohio as a standard period for hydrologic analysis. The report includes isohyetal and isothermal maps showing areal variations in temperature and distribution of precipitation, trends in precipitation and temperature, tree ring records, evaporation over land and water surfaces, average monthly and annual snowfall, magnitude and frequency of excessive precipitation, and the history of the first order Weather Stations used in this report.

b. Cross, William P. August 1950. The Crooksville area flood of June 16-17, 1950: a preliminary report. Misc. Report No. 3, 12 pp.

Report of the rainfall, peak discharges, damage, and meteorological conditions resulting in a flood in Perry County in 1950. Charts reveal precipitation records, storm data, and locations of recording rain gages.

c. Dawson, Miles. June 1959. Flood control in Ohio. W.P.A. Report No. 5, 130 pp.

Using the floods of January-February 1959 as the basis of a study, this report delineates existing and proposed flood control methods in the state.

d. Cross, William P. Feb. 1966. Flood of July 23, 1965, in the vicinity of Hillsboro. Misc. Report No. 16, 10 pp.

A summary of a survey of the flood area with respect to damage, flood stages, meteorologic conditions causing the flood, records of precipitation, and an isohyetal map of the causative storm.

e. ———. March 1947. The flood of June 1946 in Wayne and Holmes counties, Ohio. Bull. No. 9, 44 pp.

This is the first report on a small area flood in Ohio done by the Ohio Division of Water. Various precipitation records are analyzed, rainfall data and isohyetal maps of the storms are presented, and the general features, damages, and nature of the causative storms are discussed.

f. ———. 1959. Floods in Ohio—magnitude and frequency. Bull. No. 32, 154 pp.

Stream-gaging records, peak discharges, and flood stages are tabulated for selected Ohio streams and magnitude-frequency curves are drawn.

g. Flood reports.

Other flood reports by William P. Cross, which contain rainfall records, damage, meteorology of causative storms, and magnitude-frequency data, include the following bulletins: No. 14—Local floods in Ohio during 1947; No. 18—Local floods in Ohio during 1948; No. 35—Floods of January-February 1959 in Ohio; No. 38—Floods of March 1963 in Ohio and the flash flood of June 1963 in the vicinity of Cambridge; No. 39—Floods of March 1964 in Ohio.

h. 1960. Hydrologic atlas of average annual precipitation, temperature, streamflow, and water loss in Ohio. W.P.I. Report No. 13, 1960.

Four maps showing data indicated in the title for the period 1931-1960.

i. Kaser, Paul. Nov. 1959. Meteorology of floods in Ohio, January 1959, February 1959. Misc. Report No. 6, 55 pp.

Report of the magnitude of the January-February 1959 floods, the storms which caused them, and resulting damage. Data include distribution of precipitation, daily precipitation tabulations of amount and intensity, frost penetration, and analyses of storm meteorology.

j. Monthly index of conditions affecting water supply.

Monthly publication issued by the Division of Water since March 1954. It contains precipitation data, streamflow data, and information on Lake Erie levels. Each October issue contains annual summary of data from the past water year.

k. Ohio water resources—Newsletter of the Ohio Water Commission.

This is a bulletin of the Division of Water which discusses current issues concerning various phases of the water program in Ohio, such as droughts and floods. It was first published in July 1959 and is issued at irregular intervals throughout the year.

l. Frost, S. L. (Ed.) March 1959. Preliminary report of floods in Ohio, January-February, 1959. Misc. Report No. 5, 125 pp.

Description of the general features of the floods, causative storms, meteorological conditions responsible for heavy rains, and estimated damages.

m. Water inventory reports.

Survey of the water and related natural resources in each of Ohio's drainage basins, covering magnitude and frequency of floods, damage tabulations, storm distribution, precipitation, temperature, evaporation, and drought frequency. Reports of the Ohio Water Plan Inventory project include the following: No. 2—Cuyahoga and Chagrin River Basins; No. 11—Maumee River Basin; No. 15—Ohio Brush, Eagle, Straight, and Whiteoak Creek Basins; No. 16—Mahoning and Grand River Basins; No. 17—Scioto River Basin; No. 18—Little Miami River and Mill Creek Basins; No. 19—Hocking River Basin; No. 20—Port-age River and Sandusky River Basins; No. 21—Muskingum River Basin; No. 22—Lake Erie tributaries from Huron to Black Rivers; No. 23—Raccoon Creek Basin; No. 24—Great Miami River; and No. 25—Ohio River tributaries from Little Beaver to Duck Creek.

n. Water resources of (   ) county, Ohio.

Reports containing a description of the climate of the area as well as statistics concerning droughts, floods, precipitation, and average temperatures. Counties which are included are Fayette, Tuscarawas, Wayne, Holmes, Montgomery, Greene, Clarke, Cuyahoga, Madison, Licking, Pike, Scioto, Jackson, and Ross.

130. Ohio, Franklin County Conservancy District. 1916. Flood relief for the Scioto Valley: report to the Franklin County Conservancy District. 279 pp.

Report of flood rates, damage, duration of flooding, and rainfall on the Scioto River and an account of the flood of 1913.

131. Ohio Agricultural Research and Development Center. Publications.

The Ohio Agricultural Research and Development Center (known from 1882 to 1965 as the Ohio Agricultural Experiment Station) was set up to conduct research in the field of agriculture. The Center's headquarters are at Wooster, Ohio. It has a network of ten outlying farms throughout Ohio where various experiments are conducted. Bulletins are issued at intervals to report the results of investigations. Many of the studies are concerned with the effects of various climatic factors such as precipitation, evaporation, and temperature on crops and soil.

See Index for references to Ohio Agricultural Research and Development Center publications.

132. Ohio Climate and Crop Service: Annual Report.

This publication contains overall summaries of weather, precipitation, and temperature data by weeks and the time of blossoming of various plants. It began publication in 1883 as the Annual Report of the Ohio Meteorological Bureau and it terminated as the Ohio Climate and Crop Service in 1895.

133. Patton, C. A. Dec. 1934. Some observations on 46 years of Ohio weather. Ohio Agri. Exp. Sta., Bull. 544, 32 pp.

Tables of weather data, including maximum and minimum temperatures, killing frost, snowfall, evaporation, and precipitation, are presented for the years 1888-1934.

134. Phipps, Richard L. June 1961. Analysis of five years of dendrometer data obtained within three deciduous forest communities of Neotoma. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Spec. Report No. 3, 34 pp.

The effects of weather conditions on the average growth of plants is shown by correlating selected growth data obtained after 1955 with environmental data obtained during the same period. Records of temperature, precipitation, and soil moisture are presented.

See No. 126.

135. ________. 1962. Forest throughfall and precipitation interception data, 1954-1961. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Supp. No. 1, 49 pp.

A summary of throughfall and precipitation interception data collected during an 8-year study in selected deciduous communities in Neotoma.

136. ________. 1960. Radial growth of selected trees at Neotoma. M.S. Thesis, The Ohio State Univ., 66 pp.

Radial growth data obtained during 1958 in a mixed Mesophytic community of Neotoma has been statistically analyzed with time and the environmental variables of maximum temperature, soil moisture, vapor pressure deficit, and solar radiation. A correlation of growth data and environmental data for the period 1955-1959 is presented.

137. ________ and Gareth E. Gilbert. Dec. 1962. Neotoma atmospheric water vapor data, 1958-1961. Vol. 1. Data from mixed Mesophytic forest community. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Supp. No. 2, 51 pp.

Presentation of atmospheric water vapor data collected by hygrothermographs at Neotoma. Vapor pressure and vapor pressure deficit are calculated on a bi-hourly basis.

138. ________ and ________. Feb. 1962. Neotoma gross precipitation, 1957-1961. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Spec. Report No. 9, 99 pp.

Project to determine the kind, amount, and duration of each instance of precipitation occurring throughout the year in four study communities in Neotoma. Precipitation occurring immediately above vegetation and reaching the soil surface is measured, as well as atmospheric water vapor.

139. Pierce, L. T. Sept. 1966. A method for estimating soil moisture under corn, meadow, and wheat. Ohio Agri. Res. and Dev. Center, Res. Bull. 988, 16 pp.

A formula method of estimating water use by crops and the amount of soil moisture at any particular moment is presented. The method utilizes precipitation data, which provide a measure of the amount of water added to the soil profile, and air temperature data, which provide a measure of the evaporative force of the atmosphere. Data were obtained from records at Coshocton, Ohio.

140. ——————. 1960. A practical method of determining evapotranspiration from temperature and rainfall. Trans., Amer. Soc. Agri. Eng. 3(1): 77-81.

Development of a method for estimating daily evapotranspiration throughout the growing season from readily available temperature and precipitation data. Potential evapotranspiration values are determined from the mean temperature and four percentage correction factors are applied to accomplish the downward adjustments for crop stage, dryness, and occurrence of rainfall. Data from Coshocton were used.

141. ——————. 1955. Determination of crop moisture deficit in Ohio. Mimeo, 7 pp. (Available from Office of State Climatologist, ESSA.)

Progress report of studies being done on crop moisture deficit. The study involved establishing a relationship between computed and measured evapotranspiration by use of a double-mass curve plotting technique and utilized data from lysimeters at Coshocton, Ohio.

142. ——————. *c*1960. Directions for estimation of daily evapotranspiration and current soil moisture for meadows in Ohio. The Ohio State Univ., Agron. Dept. Series No. 157, 9 pp.

Relationship established between data from lysimeter records at Coshocton and concurrent temperature and rainfall data. The procedure to compute probable moisture situations is described using mean daily temperature and daily rainfall data.

143. ——————. April 1956. Estimating evapotranspiration and available moisture from temperature and rainfall. Wkly. Weath. and Crop Bull., pp. 7-8.

The purpose of this article was to develop a method whereby crop moisture deficit can be used as a reliable index of current supply of available moisture. Daily values of evapotranspiration, from lysimeter records at Coshocton, are compared with potential evapotranspiration data as computed by Thornthwaite's formula.

144. ——————. Feb. 1958. Estimating seasonal and short-term fluctuations in evapotranspiration from meadow crops. Bull., Am. Meteorol. Soc. 39:73-78.

Discussion of a procedure for estimating actual evapotranspiration from meadow crops using readily accessible meteorological data. The procedure can be used to keep an account of seasonal changes in plant-available moisture by balancing losses against current rainfall. Data were obtained from lysimeters at Coshocton.

145. ——————. July 6, 1963. How Ohio's climate is well suited to growing field crops. Ohio Farmer, pp. 10-11.

Discussion of long-term averages of rainfall frequency, rainfall probabilities for July, and the best type of weather suited for crop-growing in Ohio.

146. ——————. Oct. 1959. The occurrence of freezing temperatures in late spring and early fall. Ohio Agri. Exp. Sta., Spec. Circ. 94, 15 pp.

Percentage chances of a 32° freeze occurring on or after given dates in the spring and on or before given dates in the fall are presented for selected weather stations in Ohio. This data are given in both tabular and map form.

147. ——————. May 4, 1963. Work with the weather. Ohio Farmer, pp. 40-41.

Rainfall probabilities are presented in terms of the percentage probabilities of receiving specified amounts of rain within the period of a week. A chart reveals the chances of receiving .60 inch of rain during the week of May 17-23.

148. Platzman, George. Sept. 1963. The dynamical prediction of wind tides on Lake Erie. Meteorol. Mono., Vol. 4.

Report on the characteristics of Lake Erie wind tides, a wind stress analysis, wind-tide computations and verification, and the presentation of wind and lake level data.

See No. 113-13-b.

149. Post, F. A. and F. R. Dreibelbis. 1942. Some influences of frost penetration and microclimate on the water relationships of woodland, pasture, and cultivated soil. Soil Sci. Soc. Am. Proc. 7:95-104.

Analysis of some of the effects of frost penetration and snow depth on the soils of the watersheds in the Coshocton region under different vegetal covers. Measurements were taken of frost and snow depth, the moisture contents of frozen and unfrozen soil, precipitation, and temperature differences.

150. Powers, Charles F. See No. 113-5.

151. Primmer, Merl E. 1948. Temperature microclimates of certain crops in southern Ohio. M.S. Thesis, The Ohio State Univ., 23 pp.

A study of corn crops revealed that after the plant had reached a certain height, it created a zone of temperature disturbance localized in the upper-most area of denser vegetation. An experiment was conducted to record the temperature at varying heights of crop growth in order to explain the microclimatic phenomenon of plant insolation and heat retention.

152. Prior, John C. 1929. Runoff formulae and methods applied to selected Ohio streams. B.C.E. Thesis, The Ohio State Univ., 50 pp.

Runoff formulae-calculations are devised, based on a 10-year period of statistics, to determine the accuracy to be expected in computing monthly runoff of Ohio streams. The streams selected for the experiment and application of the runoff formulae were the Scioto, Miami, and Raccoon.

153. Reed, Everett P. 1925. Soil and climatic conditions as related to the yield and composition of sugar beets. M.S. Thesis, The Ohio State Univ., 51 pp.

Comprehensive study, conducted in Lucas and Henry counties, Ohio, of all factors affecting the yield of sugar beets. Climatic conditions discussed include temperature, precipitation, and seasonal changes in length of day.

154. Remick, John T. Jan. 1942. The effect of Lake Erie on the local distribution of precipitation in winter. Bull., Am. Meteorol. Soc. 23(1):1-4.

Discussion of snow flurries and prevailing conditions during precipitation around the lake area, including such aspects as the frictional influence of the lake on wind, thermal influences affecting evaporation, and orographic influences causing precipitation. Maps are presented of precipitation and snowfall depths from individual storms, as well as those which indicate frontal and local precipitation patterns.

155. Richards, T. L. See Nos. 113-9-b, 113-10-b, and 113-13-c.

156. Riedel, J. T. See No. 207-33.

157. Riemenschneider, Victor L. August 1964. Gross precipitation and throughfall studies at Neotoma. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., 71 pp.

Two-part report of gross precipitation studies at Neotoma. Part I presents gross precipitation data for the period 1954-1963 tabulated on an hourly, half-hourly, monthly, and subseasonal basis; snow cover and depth data; and throughfall of two deciduous communities. The data, type, duration, amount, and intensity of each precipitation tabulated are given. Part II is concerned with precipitation interception in deciduous forest communities. Important factors affecting interception are discussed and information about precipitation occurring at forest floor levels is presented for use in soil moisture dynamics studies. Principles are also established concerning relationships between gross precipitation, vapor pressure deficit, and absorption of rainfall by vegetation.

See No. 126.

158. ________ and Gareth E. Gilbert. Dec. 1962. Gross precipitation of Neotoma for 1962 through the summer season. Neotoma Ecological and Bioclimatic Lab., The Ohio State Univ., Spec. Report No. 14, 10 pp.

Gross precipitation data, tabulated from Dec. 26, 1961, to Sept. 10, 1962, are presented. The date, type, duration, and amount of precipitation for three stations at Neotoma are given in tabular form.

159. Riesbol, Herbert S. 1940. Report on exploratory study of rain-gage shields and enclosures at Coshocton, Ohio. Trans., Am. Geophys. Un., pp. 474-482.

Study to determine the ease of operation, cost, and maintenance of several types of shields and enclosures in rain gages at Coshocton. The study, conducted during the summer of 1937, includes tables of precipitation data for use in making comparisons.

160. ________. August 1938. Results from experimental rain gages at Coshocton, Ohio. Trans., Am. Geophys. Un., Part I, pp. 542-550.

Each type of rain gage at Coshocton was analyzed and any deviations in catch were recorded. This report includes the precipitation data recorded from June to October, 1931, as well as the results of an experiment conducted to test the accuracy of various gages and determine suitable exposures for each.

161. ________ and George L. Sherman. March 1938. Watercycle lysimeters for watershed studies. Agri. Eng. 19(3):123-128.

Detailed account of the design and construction of a watercycle lysimeter at Coshocton. Correlations are drawn between measurements of precipitation, evapotranspiration, and soil moisture taken at the watershed with those recorded by the lysimeter.

162. Rothenberg, Leon. August 1964. An application of synoptic climatology to the prediction of Great Lakes snow showers. U. S. Weath. Bur., Tech. Note 16, 9 pp.

Investigation of the progress of operational prediction of snow shower activity on the Great Lakes. The approach used is empirical and important prediction parameters are presented. Seven stations, including Cleveland, Ohio, were selected for the study. Data were obtained for the period 1955-1959 during the months from November to March. Information includes daily snowfall, 6-hour precipitation amounts, and wind trajectory data.

163. Rudd, Robert D. July 1957. Cyclonic and frontal activity in Ohio during the summer of 1953. Ohio J. Sci. 57(4):217-223.

Comparison of the cyclonic activities during the unusually dry summer of 1953 with the summers of 1947 and 1956. The dearth of cyclonic study activity in the summer of 1953 is discussed, frontal and cyclonic precipitation are considered jointly, and average pressure gradients for several cyclones are obtained. The data were collected at Cincinnati, Cleveland, and Columbus.

164. Sanderson, Earl E. See No. 129-a.

165. Schiff, Leonard. 1944. Classes and patterns of rainfall with reference to surface runoff. Soil Sci. Soc. Am. Proc. 8:102-108.

Discussion of the relationship between rainfall infiltration and surface runoff on small watersheds. The data used for classification, based on the magnitude of intensities and the sequence of occurrence of rainfall-intensities, were obtained from a 6-year period of records (1937-1942) at the North Appalachian Experimental Watershed in Coshocton, Ohio.

166. Schwarz, Francis K. See No. 207-38.

167. Scofield, Herbert T. and Lawrence E. Yarman. May 1943. Some investigations of the water relations of lichens. Ohio J. Sci. 43(3):139-146.

A microclomatic study at Neotoma where samples of lichens were collected at intervals and measured for water content. The purpose was to discover the source of the water within the lichens. Concurrent measurements of the humidity and temperature of the air adjacent to lichens were taken in order to correlate these data with internal moisture data. Solar radiation and vapor pressure were also recorded.

168. Sears, Paul B. July 1930. A record of post-glacial climate in northern Ohio. Ohio J. Sci. 30(4):205-217.

An investigation of the course of climatic change since the end of the Wisconsin glaciation in Ohio is made through a study of fossil pollen deposited in a Bucyrus bog. The method used in analyzing the pollen involves the tabulation of percentages of pollen grains of each species found in successive levels in the bog. From this information, the forest composition is determined and then the climatic features are deduced for the post-glacial period.

169. __________. Jan. 1916. Evaporation and plant zones in the Cedar Point marsh. Ohio J. Sci. 16(3):91-100.

Study of varying evaporation power at different locations within a habitat where a correlation is drawn between the strata of marsh vegetation and rates of evaporation at corresponding levels. The relations of evaporation to the physical exposure and zonal distribution of plants, the organic substratum, and water depth are discussed.

170. Shaw, Robert H., Gerald L. Barger, and Robert F. Dale. June 1960. Precipitation probabilities in the North Central States. North Central Reg. Tech. Comm. NC-26, Pub. No. 115, 72 pp.

Precipitation probability information, as discussed in an article by the same authors entitled "Chances of Receiving Selected Amounts of Precipitation in the North Central Region of the U. S.," is presented in graphs and maps.

See Nos. 8 and 9.

171. Shuman, Stanley B. 1949. The march of temperature in Ohio with particular reference to spring and autumn. M.A. Thesis, The Ohio State Univ., 119 pp.

Determination of the geographic distribution of selected thermal phenomena in Ohio during periods of increasing and decreasing temperature. To show how various climatic phenomena move across Ohio with changes in seasons, an attempt has been made to set the average date for the advent of spring and autumn at different meteorological stations in the state.

172. Sigafoos, Robert. 1943. Plant growth in different microclimates of a small central Ohio valley. M.S. Thesis, The Ohio State Univ., 73 pp.

Study conducted at Neotoma of the effect of variations in microclimatological factors on stem elongation and periods of flowering. The report includes detailed accounts of the growing conditions of various plants and records of meteorological data, such as temperature, humidity, precipitation, evaporation, and light intensity.

See No. 126.

173. Siple, Paul A. Oct. 1949. Environmental analysis and considerations for the selection of the ideal house for the Columbus, Ohio area. House Beautiful's Climate Control Project, House Beautiful Magazine, New York, 24 pp.

This publication is intended as a guide to the architectural group working out the ideal house for the Columbus area. A discussion is presented concerning the meanings of environmental stresses, the distribution of environmental factors, and means of controlling them. Some factors considered are precipitation, temperature, wind, solar heat, and sunshine. Their relationship to the planning of basements and roofs is shown.

174. Sitterley, John and Richard Bere. August 1960. The effect of weather on the days available to do selected crop operations: central Ohio, 1938-1957. Dept. of Agri. Econ. and Rural Sociol., The Ohio State Univ., 38 pp.

The purpose of this study was to secure information on restrictions imposed by weather on the time available for major field operations, taking into account the effects of evaporation and transpiration of plants. Several crops were studied and the influence of weather on plowing, seeding, and harvesting is discussed. A summary of favorable days for soil operations concludes the report.

175. Slaughter, George M. 1947. Uniformity of flood frequency curves of Ohio streams. M.S. Thesis, The Ohio State Univ., 92 pp.

Presentation of a method where available records of floods can be utilized to obtain more accurate magnitude-frequency figures. The method involves combining the records of 41 Ohio streams into one unit, according to the unit-graph theory. This is the theory that total annual floods expressed in a certain ratio are directly related to the normal distribution of deviations of individual streams, provided that the streams are within an area which is essentially meteorologically homogeneous and that their drainage areas are similar in permeability.

176. Smith, Guy-Harold. 1933. Weather conditions during Washington's western journey of 1770. Ohio J. Sci. 33:37-47.

Account of George Washington's journey in Ohio from October to December, 1770. The information, much of it directly quoted, was obtained from Washington's journal and can be used as documentary source material for the study of historical meteorology.

177. Smith, J. Warren. Oct. 1914. Frost warnings and orchard heating in Ohio. Mon. Weath. Rev. 42:573-583.

Description of a special fruit-frost system established at selected areas in Ohio in 1912 to obtain information about frost probabilities and minimum temperatures to be expected. Orchard heating methods are described, temperatures are predicted from dew point data, and average days for the first frost are provided.

178. __________. 1915. Phenological dates and meteorological data recorded by Thomas Mikesell between 1873 and 1912 at Wauseon, Ohio. Mon. Weath. Rev., Supp. No. 2, pp. 23-93.

An account of the activities of Thomas Mikesell, one of the first volunteer weather observers in Ohio. Tables of phenological dates of growth stages of various plants are presented, as well as tables of meteorological data recorded during the period 1873-1912. Data include monthly and annual temperature and precipitation, days of freezing weather and frost, and thunderstorm and snowfall records.

179. __________. March 1914. Possibility of recurrence of the floods of March, 1913. Mon. Weath. Rev. 42:176-178.

Discussion of the probability of another flood similar in damage, rainfall, and causative conditions to the one which occurred in Ohio in 1913.

180. __________. August 1917. Predicting minimum temperatures. Mon. Weath. Rev. 45:402-407.

Results of an experiment in Delaware, Ohio, concerning prediction of minimum temperatures. Three methods are presented: prediction by the average fall in temperature from the previous day, prediction from the median temperature and hour, and prediction from dewpoint and relative humidity in the late afternoon.

181. __________. Jan. 1912. The climate of Ohio. Ohio Agri. Exp. Sta., Bull. 235, 24 pp.

This article gives a brief account of the historical aspects of weather observation in Ohio and the general climatic features of Ohio. Tables of monthly and annual temperature and precipitation are presented, with data covering the years 1854 to 1910. Other charts reveal wind, humidity, killing frosts, annual snowfall, and temperature and precipitation data by season and section of the state.

182. __________. Oct. 1919. The effect of snow on winter wheat in Ohio. Mon. Weath. Rev. 47:701-702.

Amount of snowfall is correlated with the yield of winter wheat in three Ohio counties. Based on temperature, snowfall, and wheat yield data.

183. __________. Feb. 1914. The effect of weather upon the yield of corn. Mon. Weath. Rev. 42:78-93.

Discussion of a correlation method of tabular analysis of comparing average rainfall for 1 month with the average yield of corn for a period of 60 years. Weather effects, such as temperature, precipitation, and percentage of sunshine, during different periods of crop development are presented from a study conducted in Ohio.

184. __________. May 1915. The effect of weather upon the yield of potatoes. Mon. Weath. Rev. 43:222-236.

Correlation of weather and potato yield based on 55-year records obtained in Ohio. The study involved relating the factors of rainfall and temperature to the yield of potatoes.

185. __________. See No. 205-a.

186. Smith, R. C. See No. 199-b.

187. Smith, W. E. 1938. Modification of the index-area principle and the anticipated application of the principle to Muskingum River flood control. Trans., Am. Geophys. Un. 19:455-460.

Various methods and factors for prediction of surface runoff quantities from rainfall data are presented, as well as the relation of rainfall intensity to infiltration rates. The sample used in calculating runoff was obtained from the Home Creek Watershed.

188. Spencer, Larry E. May 11, 1960. Hydrologic study of Summit Lake. Univ. of Akron, Doc. (22/56/101).

Study of the hydrologic cycle conducted at Summit Lake with reference to the factors of precipitation, runoff, inflow, outflow, and evaporation.

189. Stoffer, Dwight R. 1966. Forecast techniques of the Cincinnati Fire-Weather District Office. 19 pp.

Bulletin describing the procedures of forecasting used by the Cincinnati Fire-Weather District, which serves Kentucky, Indiana, and Ohio and works in cooperation with the Cincinnati River Forecasting Center.

190. Straszheim, Robert E. and J. I. Falconer. April 1931. The drought of 1930 in Ohio. Dept. of Rural Econ., The Ohio State Univ., Mimeo. Bull. No. 37, 19 pp.

Analysis of the drought of 1930 in Ohio, with information presented on monthly and annual precipitation, temperature, and crop yield data.

191. Swenson, Bennett. Feb. 1937. Ohio and Mississippi River floods, January-February 1937. Mon. Weath. Rev. 71-86.

Report on the flood of 1937, including records of precipitation at selected stations, loss and damages, flood stages, and district reports from Ohio River stations.

192. Taft Sanitary Engineering Center. See No. 203.

193. Thomas, Morley K. See No. 113-11-c.

194. Thompson, Louis M. 1966. Weather variability and the need for a food reserve. CAED Report 26, Center for Agri. and Econ. Dev., Iowa State Univ., 101 pp.

Report discusses the relative contributions of weather and technology in the achievement of recent high yields of corn and soybeans. A statistical method of multiple regression is utilized to determine the influence of weather on crop production in Illinois, Indiana, Missouri, Iowa, and Ohio from 1930 to 1965. Ohio weather and crop yield data are analyzed.

195. U. S. Army, Corps of Engineers. 1945. Storm rainfall in the U. S.: Depth—area—duration data.

Analyses of about 1,000 major storms in the U.S. for the period 1875-1945. Each investigation consists of two studies. Part I is a compilation of basic precipitation data, mass rainfall curves, total storm isohyetal map, and miscellaneous information from various sources, such as original records and newspapers. Part II consists of computations of maximum depth-area-duration data for various combinations of contiguous zones, average depth of rainfall over selected areas of the storm, and tabulation of absolute maximum rainfall quantities for durations of 6, 12, 18, and 24 hours for stations within zones of excessive rainfall intensity. Twelve Ohio storms are analyzed.

196. U. S. Department of Agriculture. 1941. Climate and man: yearbook of agriculture. 1248 pp.

Volume concerned with the relation of climate to agriculture. The book is divided into sections by states and a climatic summary of each county and station is given. Data include precipitation, temperature, and frost dates. A description is presented of flooding and storms in each state. The period of data is approximately 1886 to 1938.

197. U. S. Department of Agriculture, Agricultural Research Service, Soil and Water Conservation Division, North Appalachian Experimental Watershed, Coshocton, Ohio. Annual reports.

These publications describe various experiments performed at the watershed, including studies of precipitation characteristics influencing runoff, rainfall patterns, storm characteristics, snow and frost data, point rainfall measurements, and monthly precipitation and runoff amounts. The annual reports are issued in cooperation with the Ohio Agricultural Research and Development Center.

198. U. S. Department of Agriculture, Statistical Reporting Service. Ohio weekly crop and weather bulletin.

Weekly weather and crop information is presented in narrative and tabular form. The weather section of this bulletin is compiled by the State Climatologist and gives a detailed account of the past week's weather and the effect on crops. One table reveals temperature and precipitation data for selected Ohio stations and another table records daily hot and cold, wet and dry spells for selected stations.

199. U. S. Geologic Survey. Circulars.

a. No. 177. Cross, William P., M. E. Schroeder, and S. E. Norris. 1952. Water resources of the Mahoning River Basin, Ohio; with special reference to the Youngstown area.

Summary of information concerning the water and climate for the Youngstown area. Drought, flood, and temperature data are presented in narrative and tabular form.

b. No. 340. Smith, R. C., W. L. Doll, and Garland Stratton. 1955. Water resources of the Wheeling-Steubenville area: West Virginia and Ohio.

Records of floods of various streams in the Steubenville and Ohio River area are presented in this circular, with frequency given by months.

200. U. S. Geologic Survey. Water resources review.

Monthly publication summarizing water resources data, such as seasonal runoff, snow water equivalent measurements for selected river basins, and streamflow. Each state is analyzed and supplementary weather data are included. The bulletin was first published in 1921. Each November issue contains an annual summary for the year ending September 30.

201. U. S. Geologic Survey. Water supply papers.

a. No. 334. Horton, A. H. and H. J. Jackson. 1913. The Ohio Valley flood of March-April 1913 (including comparisons with some earlier floods). 96 pp.

Various aspects of the flood of 1913, such as causes, damages, hourly precipitation, monthly temperature, and snowfall data, and isohyetal maps of the Ohio River are discussed in this report. Much of the information is presented in detailed tables. Comparisons of the 1913 flood are made with the floods in the Ohio Valley of 1907 and 1884.

b. No. 800. Grover, Nathan C. 1937. The floods of March 1936. Part 3. Potomac, James, and Upper Ohio Rivers. 331 pp.

Records of stage and discharge for about 140 measurement stations, 12 charts of meteorological data (runoff records, snow depth, temperature, isohyetal maps, and hourly, daily, and monthly precipitation), a section pertinent to the meteorological conditions associated with the flood, and a description of the two causative storms are presented in this comprehensive analysis of the Ohio River flood of 1936.

c. No. 838. ————. 1938. Floods of Ohio and Mississippi Rivers: January-February, 1937 (with section entitled "Rainfall and Runoff Studies," by W. G. Hoyt, pp. 486-594). 705 pp.

Comprehensive report of the 1937 flood on the Ohio River, with records of stage and discharge presented from 250 measurement stations. The section by W. G. Hoyt includes a study of the rainfall and runoff conditions resulting in the flood, weekly records of meteorological data (precipitation, temperature, and snowfall) from selected stations in Ohio, and an analysis of small groups of basins in the area.

d. No. 869. Youngquist, C. V. and W. B. Langbein. 1941. Flood of August 1935 in the Muskingum River Basin, Ohio. 118 pp.

Detailed account of the 1935 flood, containing such information as the following: stage and discharge at 27 points in the Muskingum Basin, flood crest stages at 143 points, comparison of data with data from previous floods back to 1847, records of precipitation, isohyetal maps, and a meteorological account of the storm.

202. U. S. Navy, Office of the Navy Representative. Jan 1959. Guide to standard weather summaries, published by direction of the Chief of Naval Operation. NAVAER50-1C-534, 561 pp.

Tabulations of various types of climatic summaries for selected locations throughout the world which can be obtained from the National Weather Records Center, Asheville, N. C. This index to standard machine tabulated summaries includes 42 Ohio stations.

203. U. S. Public Health Service, Division of Air Pollution. Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. Publications.

In recent years the name of Taft Sanitary Engineering Center has been changed to the National Center for Air Pollution Control. It is part of a network of stations set up by the Federal government to conduct experiments concerning air pollution in the United States, instigating programs for air pollution abatement, and publishing the results of these studies for public use.

a. 1962. Air pollution measurements of the National Air Sampling Network: analyses of suspended particulates, 1957-1961. Pub. 978.

Presents atmospheric sampling data which allow the assessment of past and present contamination levels and can be used for prediction of future control requirements. Results of comprehensive studies are included, such as the trends in levels of various atmospheric contaminants; geographic and meterologic factors affecting air pollution; description of air pollutants, sampling equipment, and sampling schedule; monthly radioactivity tables; and locations of National Air Sampling Network stations (11 in Ohio included).

b. Jan. 1965. Continuous air monitoring program in Cincinnati; 1962-1963. 189 pp.

Results of the operations of the Public Health Service Continuous Air Monitoring Program at Cincinnati, Ohio. Data are presented and analyzed concerning atmospheric levels of sulphur dioxide, carbon monoxide, and total hydrocarbons. The data are tabulated as hourly, daily, and monthly mean concentrations.

c. March 1967. Parkersburg, West Virginia —Marietta, Ohio: air pollution abatement activity. 87 pp.

Report of an investigation of air pollution in the interstate area encompassing Marietta, Ohio, and Parkersburg, W. Va. The purpose of the study was to appraise the nature, sources, extent, and effects of air pollution in the bi-state area. Measurements were made of ambient concentrations of sulphur dioxide and suspended particulate matter. Sensitive vegetation and selected materials were exposed to evaluate the effects of air contaminants.

d. 1961. Symposium: air over cities. Tech. Report A62-5, 209 pp.

Collection of articles by different authors concerning air pollution meteorology studies in various locations throughout the U. S. and the dispersion and deposition of air pollutants over cities. Ohio cities are included in the reports.

See Air Pollution in Index for other publications of the Public Health Service.

204. U. S. Soil Conservation Service. Publications.

a. Nov. 1941. Hydrologic data, North Appalachian Experimental Watershed, Coshocton, Ohio, 1939. Bull. No. 1.

Collection of data to determine the effects of agricultural land use practices on conservation and on floods. Precipitation, humidity, runoff, and soil moisture data for a 1-year period are recorded.

b. Precipitation on the Muskingum River watershed, Ohio, by 30-minute periods.

Monthly publication gives a detailed account of 1 month of precipitation on the Muskingum River. This bulletin is issued by the Muskingum Climatic Research Center and was begun in July 1939. Data obtained from 400-500 recording rain and snow gages are presented on charts in the form of hourly precipitation records and on maps to reveal the areal distribution of precipitation.

c. Soil survey.

This is a series of soil studies done in various counties in Ohio and contains a section dealing with climatology in each volume. A brief summary of general climatic features of the county and tables of weather data are presented. Counties included in this series are Paulding, Clinton, Fairfield, Allen, Wood, and Clark.

205. U. S. Weather Bureau. Bulletins.

a. Smith, J. Warren. 1912. The relation between the precipitation over the watershed of the Ohio River above and the streamflow at Cincinnati. Bull. 40, 40 pp.

River stage and precipitation data were recorded for the period 1861 to 1910 at monthly intervals at seven stations near the watershed of the Ohio River.

b. Garriot, E. B. 1903. Storms of the Great Lakes. Bull. 288.

This volume consists mainly of charts which present graphically the more important storms of the Great Lakes during the 25-year period 1876-1900. Each storm is illustrated by four charts which cover 32 to 48 hours of its history and two charts which present meteorological conditions of the storm. A short narrative discussion of various aspects of lake storms is included with tables of wind barometer readings and maximum wind velocity.

c. Henry, Alfred J. 1913. The floods of 1913 in the rivers of the Ohio and lower Mississippi Valleys. Bull. 520, 117 pp.

Account of the flood of 1913, including a discussion of the contributing causes of the flood, precipitation, gage readings, and flood damage.

206. U. S. Weather Bureau. Hydrologic bulletin supplements.

a. Section I. Storm of March 10-22, 1943; Ohio River and East Gulf drainage area.

Meteorological analysis of the March storm in both narrative and tabular form. The movement of the storm is presented, as well as an isentropic chart, weather map, a 10,000-ft. fixed level chart for each day of the storm, and an isohyetal map of precipitation. Daily and hourly precipitation data were obtained from official and unofficial gages along the Ohio River.

b. Section II. Storm of May 5-21, 1943; Ohio and lower Mississippi River Basins and adjacent areas.

This bulletin gives tabular recordings of daily precipitation from areas adjacent to or within the 3-inch isohyetal line for Ohio and 12 other states.

207. U. S. Weather Bureau. Hydrometeorological Reports.

No. 5. 1947. Thunderstorm rainfall. 331 pp.

Part I of this report contains a discussion of the technical aspects of thunderstorms, thunderstorm climatology, and the reliability of areal rainfall determination. Tables of total thunderstorm days for the period 1904-1943 for selected locations, as well as monthly frequency of tornadoes in each state, are presented. Meteorologic data in this report include the distribution of thunderstorms, hail-thunderstorm ratios, maximum thunderstorms per month, and rainfall-intensity patterns. Part II, a separately bound volume, consists of average monthly precipitation data, isohyetal patterns, storm profiles, dewpoints, and a chart of the rain-gage network. Ohio thunderstorms have been analyzed and are included in this report.

No. 7. June 1938. Supplement to the report on Mill Creek Basin, Ohio. 10 pp.

This is a review of an unpublished report entitled "Worst Possible Meteorologic Condition on Mill Creek, Butler and Hamilton Counties, Ohio, 1937." This report presents revisions of some of the data in the previous report, as well as supplementary information concerning precipitation and flood data, isohyetal maps, and rainfall curves. A study of the March 1913 and January 1937 floods of the Mill Creek Basin is included.

No. 25A. July 1949. Representative twelve-hour dewpoints in major United States storms east of the continental divide. 2d ed, 121 pp.

Revision of Hydrometerological Report 25, with 181 storms added to the original compilation and locations of isohyetal centers. Some of the dewpoints and reference points originally listed are revised in this report. Selected Ohio stations are included.

No. 33. Riedel, J. T., J. F. Appleby, and R. W. Schloemer. April 1956. Seasonal variation of the probable maximum precipitation east of the 105th meridian for areas from 10 to 1,000 square miles and durations of 6, 12, 24, and 48 hours. 58 pp.

A method is outlined for obtaining monthly probable maximum precipitation for any area from 10 to 1,000 square miles and for durations of 6, 12, 24, and 48 hours.

No. 38. Schwarz, Francis K. May 1961. Meteorology of flood-producing storms in the Ohio River Basin. 67 pp.

Comprehensive examination of the meteorological aspects of flood potential of the Ohio River. The study is divided into two phases: (1) an appraisal of important synoptic features of significant Ohio Valley rainstorms, and (2) critical meteorological evaluation of 16 Ohio River hypothetical flood sequences. A discussion of the major rainstorms from 1875 to 1961 in the Ohio River Basin is included.

208. U. S. Weather Bureau. Miscellaneous Publications.

a. Bulletin W (Climatic Summary of the United States). Climatography of the U. S., No. 10-29.

This publication comprises 106 sections of the U. S., each containing data from the beginning of observations to the end of 1930. Data include monthly and annual precipitation, evaporation, wind, temperature, humidity, snowfall, and frost for all or selected stations in each section. Ohio sections are numbers 68, 69, 70, and 71.

b. 1959. Climates of the states—Ohio. Climatography of the U. S., No. 60-33.

Narrative climatological summary of wind, sunshine, snow, and freeze data is presented, as well as mean monthly temperature and precipitation data for selected stations in Ohio for the period 1921-1950.

c. June 1964. Climatic studies for proposed landing system: final report. 32 vols. Report No. RD-64-54, unclassified report.

Volume 13 is entitled "Climatic Studies for Proposed Landing System for Cleveland Hopkins Airport, Cleveland, Ohio," by N. L. Canfield, O. M. Davis, and F. Grady (AD-606-833, 84 pp). This is part of a project by the U. S. Weather Bureau in cooperation with the Federal Aviation Agency which consists of 32 volumes of climatological data for 32 major airports. Ceiling, visibility, wind, and weather information is grouped seasonally and by various periods of the day. Weather categories are tabulated from 10 years of data to aid in making decisions affecting the landing systems of air terminals.

d. Climatological data, national summary.

Summary of weather conditions for the U. S. compiled from state climatological data bulletins. Published monthly and annually, summaries contain storm, flood, solar radiation, total ozone, and rawinsonde data. Prior to 1950, data found in this publication were included in the U. S. Meteorological Yearbook, which was the Report to the Chief of the Weather Bureau until 1934.

e. Climatological data: Ohio.

The monthly issues of this publication present tables of daily temperature and precipitation, heating degree day values, an index for locating each Ohio station recording temperature and/or precipitation observations, and a narrative account of unusual weather events. The annual issue contains monthly and annual precipitation and temperature data (including means, extremes, and freeze data), evaporation data, and soil temperature measurements. Past winter's monthly snowfall amounts for selected stations are contained in the July issue.

f. Climatological substation summary.

Climatic summary of local cooperative weather stations in Ohio, containing such information as mean and extreme temperatures, amount of precipitation, the general climate of the area, and the station's history. Most of the studies cover the period 1936-

1965, although a few go back as far as 1894. This series, when completed, will contain information for about one location per county in Ohio.

g. Daily series, synoptic weather maps.

This series consists of two parts. Part I, Northern Hemisphere and Sea Level Charts and 500 Millibar Charts, contains northern hemisphere maps for each day, one sea level map, and one upper air constant-pressure-surface map for each day. Each volume of this series is prepared from data observed at 1200 GMT. Part II, Northern Hemisphere Data Tabulations, contains sea level data for land and marine reports, upper air information dealing with radiosonde and rawinsonde reports from 0000 to 1200 GCT, and upper wind reports for selected locations. Part II has not been issued as a publication since December 1963 but is available in roll microfilm and microfiche form.

h. 1963. Decadal census of weather stations: Ohio. Key to Meteorological Records Documentation No. 6.11.

A publication comprised of seven maps showing the locations of weather stations in existence in January of the years 1890, 1900, 1910, 1920, 1930, 1940, and 1950.

i. 1964. Decennial census of U. S. climate—climatic summary of the U. S.—supplement for 1951 through 1960 (Ohio). Climatography of the U. S., No. 86-29, 77 pp.

Continuation of an earlier publication which covered the period 1931-1952. Monthly and annual precipitation, temperature, and snowfall averages for the length of record at most stations are presented.

j. Decennial census of U. S. climate—daily normals of temperature and heating degree days.

Bulletin gives monthly maximum, minimum, and average temperatures and the heating degree days for the period 1931-1960 for selected first order weather stations in Ohio.

k. 1963. Decennial census of U. S.—heating degree day normals (Ohio). Climatography of the U. S., No. 83-29.

Monthly and annual normals of heating degree days (measure of the departure of the mean daily temperature from 65° F.), based on data for 1931-1960 in Ohio, are given.

l. Decennial census of U. S. climate—monthly averages for state climatic divisions 1931-1960: Ohio. Climatography of the U. S., No. 85-29.

Tabulations of monthly averages of temperature and precipitation for the period 1931-1960 for each of the 10 climatic divisions in Ohio. Accumulation of 30 years of data from monthly publications of climatological data permitted calculation of normals for each division.

m. 1962. Decennial census of U. S. climate—monthly normals of temperature, precipitation, and heating degree days: Ohio. Climatography of the U. S., No. 81-29.

The climatological standard normals in this publication are based on records for the period 1931-1960. Normal values for monthly and annual averages for temperature, heating degree days, and precipitation for first order Weather Bureau stations and substations are provided.

n. 1963. Decennial census of U. S. climate—summary of hourly observations: Ohio. Climatography of the U. S., No. 82-33.

Summary of surface weather data for the 10-year period 1951-1960 collected at seven Ohio first order Weather Bureau stations. Data include temperature, wind speed, relative humidity, precipitation, and sky cover.

o. 1967. Fire-weather service operating plan for the Cincinnati Fire-Weather District. 19 pp.

Account of the objectives and methods of the Cincinnati Fire-Weather District, observation time, routine and special forecasts, and methods of communication.

p. 1964. History and catalogue of upper air data for the period 1946-1960. Key to Meteorologic Records Documentation No. 5.21, 352 pp.

Description of the history of routine radiosonde and rawinsonde observations, times of observations, transmission codes, and station networks. Dayton, Toledo, and Wilmington are Ohio stations included in this index of upper air data.

q. Hourly precipitation data: Ohio.

Monthly bulletin containing daily and hourly precipitation totals for selected stations. The first issue was published in October 1951. The annual summary lists total annual amounts of precipitation.

r. Hydrologic bulletin, hourly and daily precipitation: Ohio River district.

Tables of precipitation data from selected locations in the Ohio River District. This was a monthly publication first issued in 1952 and ending in August 1948.

s. Local climatological data.

Monthly and annual publications of climatological data obtained at first order weather stations in Ohio (Akron-Canton, Cincinnati, Cleveland, Columbus, Dayton, Mansfield, Toledo, Youngstown). The monthly issue contains daily values of temperature, dewpoint, degree days, sky cover, wind, precipitation, relative humidity, and sunshine, with a monthly summarization of data. The annual issue contains tables of normals, means, and extremes; sequential tables of monthly temperatures, precipitation, snowfall, heating degree days; and a table of station locations and histories.

t. 1942. Maps of seasonal precipitation percentage of normal by states: fifty-three years, 1886-1938. Tables of normals and 10 wettest and 10 driest seasons and years. 76 pp.

Series of maps of the U. S. and tables of individual states and sections giving information indicated by title.

u. National weekly weather and crop bulletin.

Published since 1872, this weekly report gives an overall summary of the precipitation and temperature of the U. S., as well as the effect of weather on crops and farm activities. The data are obtained from selected station records in each state. During the growing season, weekly maps show meteorologic drought conditions as determined from the Palmer Index.

v. June 1945. Preliminary report on depth-duration-frequency characteristics of precipitation over the Muskingum Basin for one to nine week periods. 12 pp.

This report contains maximum recorded precipitation over the Muskingum Basin for periods of 1 week to 2 months, the greatest storm on record transposed to a critical position over the basin, and succession of storm precipitation up to 2-months' duration to follow the transposed storm.

w. Selected climatic maps of the United States.

This publication contains a series of maps which present such data as daily maximum temperatures for January and July, surface wind roses, daily solar radiation, relative humidity, percentage of possible sunshine, total monthly precipitation, annual total heating and cooling degree days, and mean annual total snowfall.

x. Some outstanding snowstorms.

Continuously revised list of outstanding snowstorms in the U. S. since approximately 1717. Estimates of severity, extent of damage, and fatalities as a result of the storm are presented. Ohio snowstorms are included.

y. Storm data.

Monthly publication containing tables of storms and unusual weather phenomena similar to those formerly included in Climatological Data, National Summary, until December 1958. For each storm, the following information is provided: location, time, date, length and width of path, number of people killed or injured, damages, and a general description of the storm. Ohio storms are included.

z. 1956. Substation history: Ohio. Key to Meteorological Records Documentation No. 11.

Summary of information available on substation locations, elevations, exposures, instrumentations, records, observers, and a history of the changes in these substations from the dates the stations were established through 1955.

209. U. S. Weather Bureau. Research papers.

No. 30. Coons, Richard D., R. G. Gentry, and Ross Gunn. August 1948. First partial report on the artificial production of precipitation: stratiform clouds, Ohio, 1948.

Report on an experiment near Jamestown, Ohio (the focal point of all cloud seeding operations in the state), during the winter of 1948. Small pellets of carbon dioxide were dropped on a supercooled cloud to show the limitations of artificial precipitation processes in stratiform clouds.

No. 31. ——————, Earl L. Jones, and Ross Gunn. Jan. 1949. Second partial report on the artificial production of precipitation; cumuliform clouds, Ohio, 1948.

Evaluation of an experiment conducted near Wilmington, Ohio, during the spring and summer of 1948. The basic objective of the study was to determine in definite quantitative terms the practical limits and economic importance of the cloud modification process in producing or suppressing precipitation from cumulus clouds. Records were taken of cloud height, temperature, composition, humidity, optical characteristics, and behavior of unseeded clouds in the vicinity.

No. 43. Mitchell, J. Murray. March 1961. The measurement of secular temperature change in the eastern United States. 80 pp.

Description and application of an optimum methodology for measuring secular changes of temperature by use of existing monthly mean data at cooperative climatological stations in the eastern U. S. which are part of the Reference Climatological Benchmark Network. A critical review of the geographical homogeneity of secular temperature series is given.

210. U. S. Weather Bureau. Technical papers.

No. 2. Jennings, A. H. 1963. Maximum recorded United States point rainfall, for 5 minutes to 24 hours, at 296 first-order stations.

Presentation of maximum rainfall amounts for 5, 10, 15, 30, and 60 minutes and for 2, 3, 6, 12, and 24 hours at 296 stations in the U. S. (9 Ohio stations). This publication is a revision of Technical Paper No. 2 published in 1947, with corrections of maximum rainfall values as well as new maxima recorded each year since then.

No. 13. July 1950. Mean monthly and annual evaporation from free water surface for the United States, Alaska, Hawaii, and West Indies. 10 pp.

Compilation of evaporation averages based on records of 5 years or more prior to Jan. 1, 1949. Stations in Ohio are those at Charles Mill Dam, Chesapeake, Columbus, Dayton, Wooster, and Senecaville Dam.

No. 15. 1958. Maximum station precipitation for 1, 2, 3, 6, 12, and 24 hours. Part XXII: Ohio. 137 pp.

Statistics presented in this report include the following: maximum observed precipitation for durations of 24 hours or less, month-to-month variation of maximum values, monthly distribution, and maximum monthly precipitation amounts. Data were obtained at 119 Ohio stations during the period 1940-1950.

No. 16. Jennings, Arthur H. Jan. 1952. Maximum 24-hour precipitation in the United States. 284 pp.

Tables and charts of maximum observed 24-hour precipitation at selected stations are presented. The amounts are expressed as water equivalents and were taken from records extending at least 10 years up to 1949. The charts reveal the three greatest amounts of 24-hour precipitation for each state each month, with the station location and date of occurrence. Ohio stations are included.

No. 20. Wolford, Laura V. 1960. Tornado occurrences in the United States. 71 pp.

The purpose of this report was to bring up to date available records of all tornadoes in the U. S. and their frequency and occurrence in different sections of the country. Data are included for the period 1916-1958 and include areal distribution, damages, characteristics, length and width of paths, groups, and outstanding tornadoes. Ohio tornadoes are analyzed in the report.

No. 25. Dec. 1955. Rainfall intensity-duration-frequency curves for selected stations in the United States, Alaska, Hawaiian Islands, and Puerto Rico. 53 pp.

Presents set of rainfall intensity-duration curves for durations of 5 minutes to 24 hours and return periods of 2, 5, 10, 25, 50, and 100 years for each of 203 selected Weather Bureau stations, including 6 in Ohio.

No. 29. Rainfall intensity-frequency regime. Part I: the Ohio Valley. June 1957. 44 pp. Part V: Great Lakes region. Feb. 1960. 31 pp.

This report is part of a series being prepared to provide material for use in planning criteria for flood prevention programs. Rainfall-intensity-duration-area-frequency regime and other storm characteristics, for durations of 20 minutes to 24 hours, area from point to 400 square miles, and frequencies for return periods of 1 to 100 years are presented for the Ohio Valley and the Great Lakes regions. Isopluvial maps are included.

No. 35. 1959. Climatology and weather services of the St. Lawrence Seaway and Great Lakes. 75 pp.

Climatological data (wind, temperature, precipitation, humidity, clouds, fog, and ice) are presented in tabular form for major ports of the Great Lakes. The weather services and warning display stations in operation are described, including Ohio stations at Toledo, Cleveland, Sandusky, Ashtabula, Huron, Port Clinton, Kelley's Island, and Put-In-Bay.

No. 37. Kohler, M. A., T. J. Nordenson, and D. R. Baker. August 1959. Evaporation maps for the United States. 13 pp., 5 plates

Maps of the United States are presented which give such information as the average annual Class A pan evaporation, average annual lake evaporation, average annual Class A pan coefficient, average May-October evaporation in percent of normal, and standard deviation of annual Class A pan evaporation. Correct interpretation and use of the plates are explained.

No. 40. Hershfield, David M. May 1961. Rainfall frequency atlas of the United States for durations from 30 minutes to 24 hours and return periods from 1 to 100 years. 61 pp.

This paper is a convenient summary of empirical relationships, working guides, and maps useful in practical problems requiring rainfall data. The first part presents rainfall analyses, including measures of quality of various relationships, numerical examples, transformation from point to areal frequency, and seasonal variation. The second part presents 49 rainfall frequency maps, several related maps, and seasonal variation diagrams.

No. 50. 1964. Frequency of maximum water equivalent of March snow cover in North Central United States. 24 pp.

Maximum water equivalent values of snow on the ground for first and second halves of March are presented for probabilities of 50, 20, 10, 4, 2, and 1 percent, based on records averaging 9 years in length. Supplementary studies concerning snow depth are included.

211. Verber, James L. July 1955. The climate of South Bass Island, Western Lake Erie. Ecology 36:388-400.

Report on the climate of South Bass Island (Put-In-Bay) and the effects of Lake Erie on the climate. Daily, hourly, and monthly temperatures are recorded, as well as data on precipitation, evaporation, and solar radiation. A study was conducted of the seven thermal microclimates found on the island.

212. Villmow, Jack R. Nov. 1958. Daily weather maps as illustrations of weather types. Ohio J. Sci. 58(6):335-342.

Daily weather maps are used to illustrate the relation of the circulation of air at middle and high levels to patterns of surface weather phenomena, such as diverging and converging jet streamflow, seasonal variations, and flood patterns. Ohio is included in this study conducted by the Dept. of Geography, The Ohio State University.

213. Visher, Stephen S. 1954. Climatic atlas of the United States. Harvard Univ. Press, Cambridge, 403 pp.

This volume consists of 1031 maps with supplementary text of the following data: annual, seasonal, monthly, and weekly normal temperatures; killing frosts and extreme temperatures; winds; atmospheric pressure; storms; radiation; sunshine; humidity; evaporation; precipitation; tornadoes; cyclones; fog; effect of the Great Lakes; climatic regions; and the consequences of climate on agriculture, health, and soil erosion.

214. Wallace, Atwell M. and Norman B. Stout. Jan. 1962. Transpiration rates under controlled environment: species, humidity and available water as variables. Ohio J. Sci. 62 (1):18-26.

Transpiration rates were determined for coleus and geranium plants in an experiment by the Botany Dept., The Ohio State University. A modification of the gravimetric method was utilized, with light intensity, wind velocity, and temperature held constant while humidity and water availability were varied.

215. Weaver, C. R. Jan-Feb. 1956. Outline method to tell when to spray for spittlebug. Ohio Agri. Exp. Sta., Ohio Farm and Home Res. 41(298): 12.

Report of a method to tell when to spray for spittlebug. Method is based on the principle of using accumulated "degree days" of temperature. The best day for spraying is determined when degree days have accumulated to a specified amount.

216. Weisent, Ray F. 1949. Rainfall-runoff correlation. M.S. Thesis, The Ohio State Univ., 52 pp.

Report of a study conducted at Big Walnut Creek above Central College, Ohio, in which a method was devised for calculating intermediate runoff in order to estimate flood flow at critical points on the river when rainfall and streamflow records are available.

217. Williams, Robert E. Sept. 1961. An ecological note on the microclimate of three species of ants. Ohio J. Sci. 61(5):279-282.

Temperatures of air, surface, and within ant tunnels are recorded for different habitats of three species of ants. The measurements were taken during August and September 1959 at Neotoma. This study is part of the micro-environmental research being conducted at Neotoma.

See No. 126.

218. Wilson, J. D. Jan.-Feb. 1940. An evaporation-index meter for use in irrigation practice. Ohio Agri. Exp. Sta., Bimon. Bull. 25(202):3-6.

Evaporation and rainfall data for a 4-year period are analyzed and an evaporation-index meter is presented for determining evaporation-rainfall differentials. The relation existing between rainfall and evaporation is an important factor in the regulation of irrigation practices.

219. ——————. May-June 1939. Comparative evaporation rates in normal forest, open park, and cleared areas. Ohio Agri. Exp. Sta., Bimon. Bull. 24(198):64-69.

Data are presented from a 4-year study of the variations in influence of the light factor on evaporation. The data were collected by black and white atmometers placed on sites of three different exposures at selected state forests in Ohio.

220. ——————. May-June 1937. Evaporation studies. I. A survey of evaporation and light values in greenhouses. Ohio Agri. Exp. Sta., Bimon. Bull. 22(186):87-97.

Report of a 12-month survey of evaporation and light values in which black and white atmometers recorded evaporation rates in 31 greenhouses located throughout Ohio. The greenhouses varied as to type and construction and a variety of crops were grown under different temperatures, moisture conditions, and light intensities.

221. __________. March-April 1939. Evaporation studies. III. Ten years of evaporation at Wooster as measured with black and white atmometers. Ohio Agri. Exp. Sta., Bimon. Bull 24(197): 11-25.

Monthly evaporation rates from May to September are recorded for the period 1928-1937. Weather factors, such as rainfall, temperature, humidity, wind velocity, and influence of sunshine, were correlated with evaporation data recorded by atmometers. A detailed analysis is presented on the effect of sunshine on evaporation in causing droughts.

222. __________ and J. R. Savage. March 1936. An evaporation survey of Ohio. Ohio Agri. Exp. Sta., Bull. 564, 53 pp.

Summary of evaporation data obtained at 57 Ohio stations for the years 1926 to 1931. The survey involved determining the relationships between evaporation rates and the distribution and prevalence of certain insects and comparing rates of rainfall and evaporation at various stations.

223. Wolfe, John N. 1947. Microclimates along the highways. The Ohio State Univ., Papers, Dept. of Botany, pp. 121-130.

Discussion of microclimate and an explanation of studies being conducted at Neotoma are presented. A cross-sectional view of Neotoma is shown revealing temperature regimens at various locations. The article concludes with a brief discussion on beautification of highways and roadside parks through use of microclimate knowledge.

See No. 126.

224. __________. Jan. 1945. The use of Weather Bureau data in ecological studies. Ohio J. Sci. 45:1-12.

Problems in determining microclimates and the discrepancies in Weather Bureau records are discussed. The article supports the idea that microclimatic studies are of more value than macroclimatic investigations since macroclimatic data often fail to be accurate, even in adjacent areas.

225. __________ and Gareth E. Gilbert. March 1956. A bioclimatic laboratory in southern Ohio. Ohio J. Sci. 56(2):107-120.

Report concerning studies at Neotoma which supply information regarding the physics of microenvironments to processes in plants and animals. Temperatures are recorded vertically at eight levels above and below the soil surface. Precipitation and evaporation data are obtained from various locations within Neotoma in order to contrast microclimatic and macroclimatic phenomena.

226. __________, Richard T. Wareham, and Herbert T. Scofield. Oct. 1949. Microclimates and macroclimates of Neotoma, a small valley in central Ohio. Ohio Biol. Survey, The Ohio State Univ., Bull. 41, Vol. 7, 267 pp.

Comprehensive study of the macroclimates and microclimates of Neotoma, with reference to weather factors such as precipitation, temperature, drought, and humidity in relation to biotic phenomena. The year was divided into four seasons with ten subseasons based on phenological events observed during the period of research. The report includes a description of phytomicroclimatology and a review of studies conducted previously at Neotoma.

227. __________, __________, and __________. 1943. The microclimates of a small valley in central Ohio. The Ohio State Univ., Papers, Dept. of Botany, pp. 154-166.

Summary of microclimatic data collected at Neotoma, such as temperature, evaporation rate, light intensity, radiation, snow cover, cold-air drainage, and insolation. These are the major factors in cyclic seasonal periodicity of individual plants and the modification of microenvironments.

228. Wolford, Laura V. See No. 210-20.

229. Young, M. C. and L. L. Harrold. Nov. 1964. A new source of error in recording rain gage catch. Agri. Eng. 45:622-623.

A malfunction in a rain gage at Coshocton, Ohio, revealed a slight dent and crack in the gage. A table is presented in this article comparing rainfall catch in three gages to check for leakage.

230. Young, R. Frank. 1917. Tornadoes of March 11, 1917, in Montgomery County, Ohio. Mon. Weath. Rev., pp. 117-118.

Brief account of the 1917 tornadoes, covering such aspects as the paths of the tornadoes through Montgomery County, damages, and a description of the causative storms.

231. Youngquist, C. V. See No. 201-d.

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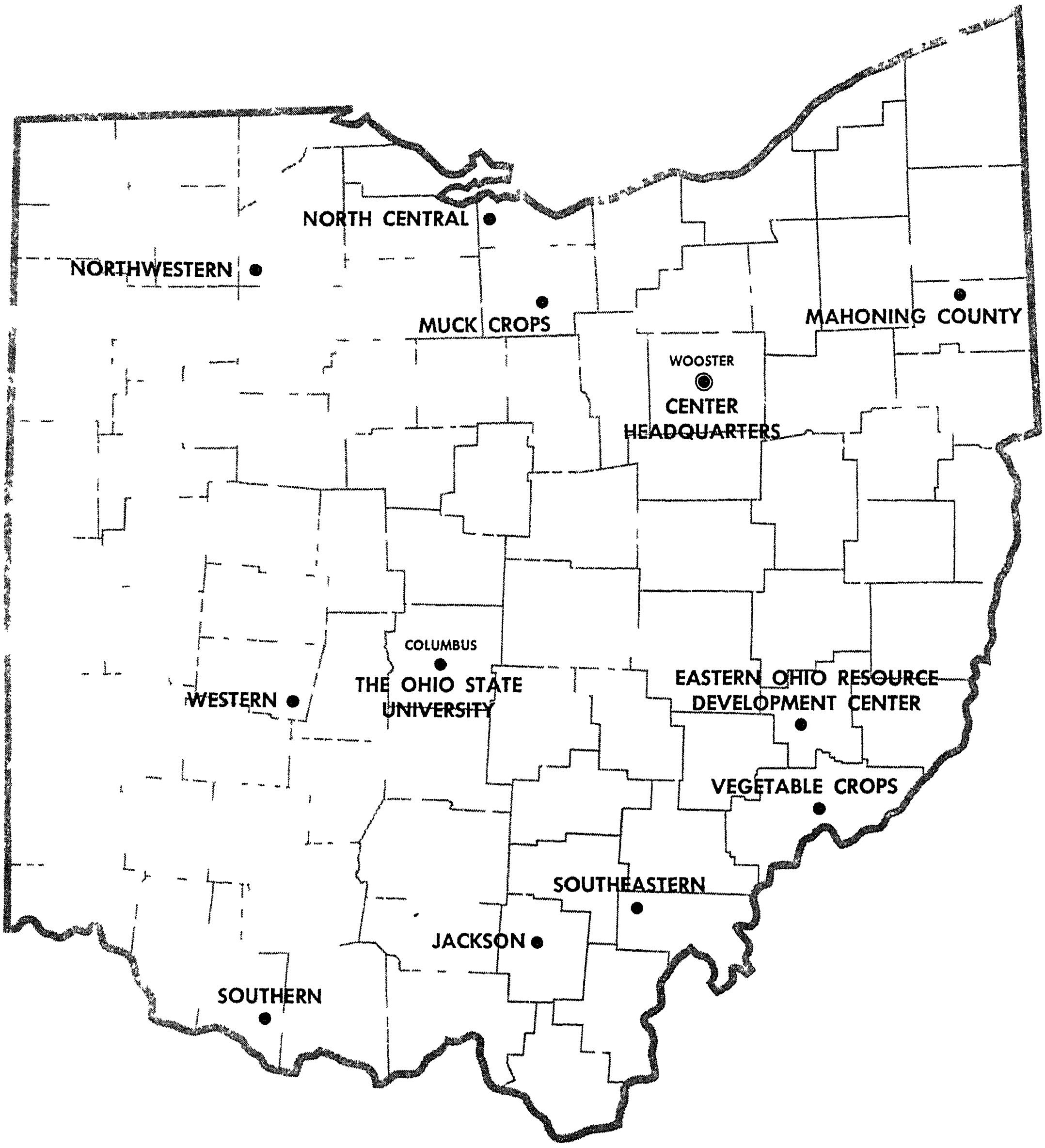
The State Is the Campus for Agricultural Research and Development



Ohio s major soil types and climatic conditions are represented at the Research Center's 12 locations. Thus, Center scientists can make field tests under conditions similar to those encountered by Ohio farmers

Research is conducted by 13 departments on more than 6200 acres at Center headquarters in Wooster, ten branches, and The Ohio State University.

Center Headquarters, Wooster, Wayne County: 1953 acres

Eastern Ohio Resource Development Center, Caldwell, Noble County: 2053 acres

Jackson Branch, Jackson, Jackson County· 344 acres

Mahoning County Farm, Canfield: 275 acres

Muck Crops Branch, Willard, Huron County: 15 acres

North Central Branch, Vickery, Erie County: 335 acres

Northwestern Branch, Hoytville, Wood County: 247 acres

Southeastern Branch, Carpenter, Meigs County: 330 acres

Southern Branch, Ripley, Brown County: 275 acres

Vegetable Crops Branch, Marietta, Washington County: 20 acres

Western Branch, South Charleston, Clark County: 428 acres